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LETTERS AND JOURNAL

OF

W. STANLEY JEVONS

W. S. Jevons.

Aet. 42

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LETTERS & JOURNAL

OF

W. STANLEY JEVONS

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EDITED BY HIS WIFE

London
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1886

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PREFACE.

In arranging this selection of my husband's letters, my object has been to give an account of his life in his own words, as much as possible. It is hardly necessary to say that none of the letters were written with a view to publication; but with the exception of omissions, and of occasional obvious errors, occurring through haste in writing, they have been left quite unaltered.

My warmest thanks are due to Mr. James Sime, who has helped me in seeing this volume through the press, as well as in the task of selecting and arranging the letters. So many had been preserved by different members of Mr. Jevons's family that it would have been easy to fill two volumes of this size, and I found it almost impossible to make a selection which would give, to those who knew my husband only by his writings, the best idea of his character as a man in the different relations of life; and after all no one can be more conscious than myself of the incompleteness of the book from this point of view.

I have placed at the end of the volume as complete a list as I could form of my husband's writings, with the exception of reviews of books which he occasionally wrote for *Nature* and other papers.

I wish to take this opportunity of most sincerely thanking those correspondents of my husband who have entrusted me with his letters, and permitted me to make my own selection for publication.

HARRIET A. JEVONS.

2 THE CHESTNUTS, HAMPSTEAD.

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"*For my own part I felt it to be almost presumptuous to pronounce to myself the hopes I held and the schemes I formed. Time alone could reveal whether they were empty or real; only when proved real could they be known to others.*"—Journal, 1862, p. 13.

LETTERS AND JOURNAL

OF

W. STANLEY JEVONS.

CHAPTER I.

1835–1851.

WILLIAM STANLEY JEVONS, the son of Thomas and Mary Anne Jevons, was born at No. 14 Alfred Street, Liverpool, on the 1st September 1835.

The Jevons or Jevon family (for the final s was first added by Stanley's grandfather) is evidently of Welsh origin, but they had been settled in Staffordshire for many generations. At Cosely in that county Timothy Jevon, the great-grandfather of Stanley, lived; and here his grandfather, William Jevons, was born and grew up to manhood. William Jevons had but slight educational advantages, but he was endowed with a great deal of good sense, and was a man of strong affections and of much religious feeling. Having been brought up at home and employed in his father's trade of nail-making, he became assistant to a Mr. Stokes, engaged in the nail trade at Old Swinford, and it was to increase the business of Mr. Stokes that he removed to Liverpool at the end of the year 1798, accompanied by his wife and young family, consisting of three sons and a daughter. He had not been long in Liverpool before he was enabled, with the assistance of capital lent him by a friend, to commence business on his own account as an iron merchant. Mr. William Jevons gave to all his children

the best education in his power, and when his eldest son Thomas grew up he took him into his own business, and before long made him a partner. Later on, Timothy, the youngest son, joined the firm, which was known as Jevons and Sons.

Mr. William Jevons attended the Unitarian chapel, then situated in Benn's Garden, and his second son William became a Unitarian minister, after receiving his college education at York, then the home of Manchester New College. He was an intellectual, cultivated man, but owing to a change in some of his opinions he early left the ministry. He wrote several books—one of them a small book on astronomy for the use of schools. Between him and his nephew Stanley there was great affection and sympathy, and they corresponded a good deal.

Mr. Thomas Jevons, the father of Stanley, was a man of much ability in many ways, and there is no doubt that Stanley inherited a love of science from him. He was greatly interested in all new engineering schemes, and was acquainted with the first railway makers, Stephenson and Locke. In 1815 he constructed probably the first iron boat that sailed on sea water, and in 1822 he made an iron life-preserving boat, and also a model of a floating ship or landing-place for steamboats. He supported the scheme for the construction of the Thames Tunnel, by which he lost a considerable sum of money. In 1834 he published a small book called *Remarks on Criminal Law*, and in 1840 a pamphlet entitled *The Prosperity of the Landholders not Dependent on the Corn Laws*. In later life Stanley described his father as "one of the most humane of men," and as being remarkable for "a calm clear mind." He was of too shy and retiring a nature to go much into general society, but he was always the devoted friend of his children, even when the cares of business pressed most heavily upon him.

On the 23d November 1825, Thomas Jevons was married to Mary Anne, the eldest daughter of William Roscoe, the well-known author of the *Life of Lorenzo de' Medici* and of the *Life and Pontificate of Leo X.* Mrs. Thomas Jevons was about thirty at the time of her marriage. Her youth had been spent at Allerton Hall, near Liverpool,

where her father lived until the loss of his fortune caused him to remove, about the year 1820, to a small house in the immediate neighbourhood of Liverpool. She was remarkably handsome, with very fascinating manners, and her mind had been cultivated by constant companionship with her father and by the intellectual society which she enjoyed under his roof. She inherited a good deal of her father's poetical talent, and was the authoress of a small volume of poems, printed for private circulation. She also edited the *Sacred Offering*, a collection of poems which came out in yearly volumes for several years, and the contents of which were chiefly written by members of Mr. Roscoe's family, for his younger daughter and several of his sons also inherited more or less of his talent. Mrs. Thomas Jevons was a woman of strong religious feeling. Like her husband, she had been brought up a Unitarian.

Although Stanley was the ninth child of his parents, only three of those older than himself survived beyond babyhood: Roscoe, born 1829; Lucy Anne, 1830; and Herbert, 1831. At the time of his birth his mother was still mourning the loss of a twin boy and girl who had died of influenza in 1834, and of another baby boy who had died in the spring of 1835. This must have made Stanley as a young child somewhat solitary in his plays and occupations, for the two nearest to him in age were his brother Herbert, who was four years older, and his sister Henrietta, three and a half years younger, than himself. He had also a younger brother, Thomas Edwin, born in October 1841, who, though too young to be a companion in childhood, was the closest friend of his later life.

The house in Alfred Street had been built for Mr. Thomas Jevons, from his own designs, at the time of his marriage, but it was not large enough for his increasing family, and when Stanley was about a year and a half old, his father removed to No. 9 Park Hill Road, one of two new houses built from his own designs—for Mr. Thomas Jevons took great pleasure in planning houses, and showed much skill in doing it. The other house was occupied for the first few years by his brother, Mr. William Jevons, and later by his younger brother, Mr. Timothy Jevons, and his family. His

father and mother, Mr. and Mrs. William Jevons, lived in a large old house close by, the garden joining his son's. At that time Park Hill Road was almost in the country: besides the large gardens attached to the houses there were fields and lanes close by, so that the children could have plenty of healthy out-door life. Mr. Thomas Jevons' house is still standing, and is now used for the Sunday school belonging to the Unitarian Chapel in Toxteth Park Road. The rooms remain the same as he planned them, but the surroundings are so changed that it is difficult, if not impossible, to realise the place as it was. The gardens are all gone, and the neighbourhood is built up with a poorer class of houses, and is now part of the town.

The first thing that Stanley could remember occurred during the great storm of January 1839, before he was three and a half years old. One of the chimneys of the house of his uncle, William Jevons, was blown down, and Stanley's mother was so much alarmed that she had her children roused from their beds and carried down to the cellar for safety. He could also remember suffering, when he was very young, from an attack of croup in the night, and being put into a warm bath, with the doctor standing by. But on the whole he retained a less vivid impression of his very early childhood than many people of ordinary ability do.

Of all her children, Stanley was the one who most resembled his mother in personal appearance. His eyes, which were a blue-gray in colour, were, like hers, large and full of expression, and were shaded with peculiarly long dark eyelashes, which greatly added to their beauty. A friend writing of him says: "I remember him when such a little fellow with bright curly hair. What a fine noble boy he was!" Another friend remembers his running into the room one day when she was with his mother, and asking for some employment, saying with great energy, "I cannot live unless I have something to do." As a young child he almost always had occupations which he made for himself, and nothing tried his naturally passionate temper more than to be compelled to leave the interest of the moment whilst still engrossed in it.

His sister says that Stanley learned to read and write

without any difficulty, and certainly the following letter at six years old in his own handwriting is very good for a child of that age :—

"MY DEAR GRANDPAPA—When will you come home? I am six—I was six on Wednesday, and Mamma gave me a paint box. There was a beautiful rainbow to-night. I have got a sixpenny little boat. Good-bye, dear grandpapa.—Your affectionate STANLEY JEVONS."

Another little letter has also been preserved, written when he was seven years old, to Dr. Richard Roscoe, his mother's younger brother, who was a frequent visitor at her house.

"DEAR UNCLE—I thank you for the picture. I sometimes say my lessons well. I draw almost every day, and I paint sometimes. Nurse is going, and another is coming. Tommy is a very big boy, and is very funny. When will you come again and see us? Henny has got a bad cold. Good-bye.—Your affct. nephew, STANLEY."

Mrs. Thomas Jevons always encouraged her children in their love of drawing and music; and Stanley's love of music, which he inherited from both his parents, was through life one of his greatest pleasures. His mother also taught him botany, in which he took great interest, and he always kept the little microscope which she had given him to examine flowers with. From her, too, came his first teachings in political economy, as she read with him Archbishop Whately's *Easy Lessons on Money Matters*, written for children. He was not what is usually called a precocious child, but he was very thoughtful and extremely observant, and eager to acquire information. In speaking of himself he once remarked, "I am said to possess much curiosity, and I often felt a positive pain in passing any object which I could not understand the construction and meaning of."

He was always very dexterous in using his fingers. His uncle, Dr. Roscoe, gave him a set of bookbinding tools, and I have a little book bound by him when quite a young boy, the binding of which is a very creditable piece of workmanship for his age.

For outdoor occupations Stanley had his own little garden in which he worked; he had also some ducks for

pets, of which he seems to have been very fond. But his greatest pleasure was to be with his eldest brother, Roscoe, who had great talents for mechanical construction. Their workshop was a coach-house and stable, and here many happy hours were passed by Stanley in watching and helping his brother. When Mr. Timothy Jevons came to occupy the third house instead of his brother William, Stanley had the companionship of two boys about his own age, and the cousins must have had frequent opportunities of meeting, for they had the kindest of grandparents, who permitted their garden to be the constant play place of the two families of cousins.

Until the failure of his mother's health, Stanley's home must have been as happy a one as a child could have, and he always felt it to have been so; but, in 1845, Mrs. Thomas Jevons became so ill that she went to London, chiefly to be under her brother Dr. Roscoe's care, and in November of that year she died there without seeing her children again.

The following letter was written to his mother whilst she was away:—

"MY DEAR MAMMA—I hope you are better. I am quite well now, and I am getting on very well in my lessons. I am translating very small histories of great men, and of countries, and I know the first twenty propositions of Euclid, and I also write French exercises and the verbs, and exercises in English composition, and write copies. Yesterday Roscoe, Herbert, and I took a very long walk to Allerton Hall. We started at half-past three, and went up through the Prince's Park, and then went past Mrs. M——'s old house into Aigburth road a great way, and through roads, and at last found our way by finger-posts, and came back the proper way about six o'clock, when it was nearly dark, not very much tired; and in the morning we went to chapel, but papa did not go. We are getting on very well in everything. I found a book of Uncle Richard's, called the *Prescriber's Pharmacopœia.* Roscoe, Lucy, Herbert, I especially, and all the rest of us, send our best love. Good-bye.—Your most affectionate son,

"WILLIAM STANLEY JEVONS."

From this time Stanley's eldest sister filled, as far as she could, her mother's place in the home; and though a governess continued to reside with them for a year or two, it was to their sister that the younger ones were indebted for a love and care which can only be described as motherly, and which was returned on their parts by the warmest affection for her. Until he was more than ten years old Stanley was taught at home by a governess, but early in 1846 he became a day scholar at the Mechanics' Institute High School in Liverpool, which his brother Herbert was attending. The late Dr. Hodgson, afterwards Professor of Political Economy at Edinburgh, was then headmaster of the High School. Two or three of the school reports of Stanley's conduct and progress have been preserved, with Dr. Hodgson's comments to his father. In April 1846 he writes, "W. S. seems a very fine little boy," and in January 1847, "W. S. J. will do very well indeed, if he gain courage and spirit as he grows older." The French master writes in the reports that he is very good and very industrious, but far too quiet, makes no noise, and does not read above his breath. He adds, "I should go to sleep if all the class were like him."

In after life Stanley felt that he had gained much from Dr. Hodgson's teaching; and he regretted that his father had removed him so soon from the school. In June 1847 he received the prize of his class, a large volume of Crabbe's poems, in which the following inscription is written:—

"This Book, being one of the Prizes granted by George Holt, Esq., is assigned to W. S. Jevons, as first pupil in the 6th class of the High School, his conduct and attention throughout the year having been not less satisfactory than his progress."

Mr. Thomas Jevons at this time removed both his sons from the High School, because he thought some of the boys attending it were undesirable companions for them, and after the summer holidays, Stanley was sent to Mr. Beckwith's private school in Lodge Lane as a day scholar.

In January 1848 the firm of Jevons and Sons failed. Stanley never forgot one Sunday when, instead of going to chapel as they were in the habit of doing, his grandfather,

father, and uncle were shut up all the morning together with the books of the firm. He was much puzzled and rather shocked at the proceeding, which was his first intimation that anything was wrong.

This misfortune made a great change in the circumstances of the three families in Park Hill Road. The houses were given up at once, and Mr. Thomas Jevons removed with his family to No. 125 Chatham Street. Mr. William Jevons, who had lost his wife in 1846, became from this time a member of his eldest son's household. He brought with him an organ, on which Stanley used to play a good deal; and he did it well enough to give much pleasure to his grandfather and father, who were both very fond of music, although unable to play any instrument themselves.

Owing to the failure it had become necessary for the family to live as economically as possible. Stanley was old enough to understand this, and it early taught him to be very careful in what he spent, and always to try to lay out his small sums of money to the best advantage. He still continued at Mr. Beckwith's school. He used to speak of this as almost a wasted time in his education after the teaching he had had at the Mechanics' Institute High School; but he acknowledged that the attention paid to Latin at Mr. Beckwith's was of service to him, and saved him future trouble, for he had no natural talent for learning languages. His half holidays were often spent in walks with his two cousins, who still lived near. The summer holidays were spent either at Parkgate, a little old-fashioned place at the mouth of the Dee, or at West Kirby, also on the Dee; and he always retained an affection for that neighbourhood.

He was at this time a quiet thoughtful boy, very shy and reserved, and quite unconscious of his own abilities, but on 31st January 1849 his elder sister made the following entry in her diary: "In Stanley I see the dawning of a great mind."

In the summer of 1849 Stanley went with his younger sister and brother to Nantwich, to pay a visit to his mother's sister, Mrs. Hornblower, whose husband was the Unitarian minister there. Aunt Jane had great affection for her nephews and nieces, and Stanley at different times spent

many pleasant weeks under her roof. During this visit his father wrote to him: "I must begin this letter by thanking you for your manly and excellent note to me. In it I see signs of ripening thought and judgment, which gives me great joy. In this visit you are not only adding vigour to your bodily frame, but I feel satisfied that you are gaining manliness, and gaining some little power over that natural timidity of character which is the worst or perhaps I may say almost the only weakness you have. A little more observation of the world, and a habit of looking closely into the origin of the fears that create the timidity or bashfulness which you occasionally display, will help you wonderfully to get the better of it."

After the summer holidays of 1850, when he was just fifteen, Stanley was sent to London to attend University College School; and for a short time he stayed with his brother Herbert in Harrington Street. Afterwards he lived for several months in Gower Street, in the house of a lady who received as boarders boys attending University College School. Here he was very unhappy, partly perhaps because it was the first time he had lived with strangers, but also because he had good reason to dislike his three fellow-boarders. Years afterwards he wrote in his journal that he never passed the house without a feeling of dread at the remembrance of what he suffered there.

Five weeks after his arrival in London he wrote to his father: "Everything is done so systematically that I like the school altogether very much." On the 17th of November 1850 he again wrote to his father: "I have been a grand sight-seeing to-day, and have walked nearly from one end of London to the other. I started a little before ten o'clock, and went straight to St. Paul's. They do not let you go into the choir if you come very late, and I only saw what I had seen before. I then went and saw Smithfield and St. Bartholomew's and the Post Office, after which I went along Cheapside to the Exchange, etc. I next found my way to the Tower of London, and then to the Thames Tunnel, into which I went. From the Tunnel I came back and went along the Strand, Whitehall, St. James's Park, and Green Park, the Exhibition in Hyde Park, and then along

Oxford Street, Regent Street, and home, where I arrived at half-past four ready for dinner. The Glass Palace is getting on famously, and I saw some of the glass. All the work looks very light and slender, but I suppose that the iron will be quite strong enough. Great crowds go to see it. If the half-finished building makes such a stir, what will the Exhibition itself do!"

He was greatly interested in the "Glass Palace," and often visited it. On the 1st of June 1851 he wrote to his father: "Last Wednesday I went to the Exhibition. I think that nothing can be more astonishing or wonderful than to walk round the galleries, or to look from one end to another, and though I had heard every one talk of it for a long time, and had seen numbers of pictures of it, I did not expect it to be so splendid. It was a long time before I could stop to look at any particular thing instead of staring about, and still longer before I could leave the nave. I liked the organs especially, and perhaps spent too much time in listening to them instead of looking at the other things. I spent some time in watching cotton and flax spinning and weaving, which I never properly understood before."

Again, on the 5th of July 1851: "I went last Monday to that place of all places, the Great Exhibition. I went through a good part of the south-western division of the building, where the minerals, chemicals, vegetable productions, agricultural implements, and hardware things are. I have learnt a great deal since I came to London about minerals and the metals, particularly from my chemistry and partly from museums; and I intend if I have time in the holidays to arrange all the minerals and fossils I have got at home. I saw also the *Illustrated London News* steam press, which is very wonderful. I had not observed the hydraulic press from the Britannia Bridge before. What an immense thing that is! I heard Gray and Davidson's organ at the east end of the nave played, and liked it better for its size than the largest. In the American part some ass of a Yankee had put a piano with a fiddle, and by turning a handle the fiddle begins to squeak; and, to the disgrace of mankind, it must be said that there is as great a crowd round this thing as round anything else almost in the place."

His father was much pleased with his progress at school. On the 19th November 1850 Mr. Jevons wrote: "I am glad to see the first report of your character and progress and standing in your school. It is very good, but only what I expected from you." And again on the 18th March 1851: "I was not a little gratified by the receipt of your character as pronounced by your several masters. I have no doubt of its truthfulness, and it is highly honourable to you. Go on in like manner, and prosper you must in whatever walk of life you select." On the 28th June 1851 he wrote: "I shall be very glad when your holidays commence, for it seems a long time to be deprived of your society, and I shall begin now to look to you for assistance in family affairs by consultation and advice. . . . I need the help of a friend in whom I can trust, and I must bring you forward to take part in the battle of life, young as you yet are."

At midsummer 1851 Stanley returned to Liverpool, bringing with him five prizes, three first and two second. His school-days were then at an end, for at that time boys did not remain at University College School beyond the age of sixteen, and he would attain that age during the holidays. He was already beginning to think about some of the difficult problems of philosophy, and before his return to college in October he had written an essay on "Free Will and Necessity," in which he tried to prove that the arguments in favour of the doctrine of necessity were much stronger than those in favour of the doctrine of freedom of will.

Looking back upon his early boyhood, he wrote in December 1862, when he was twenty-seven years of age: "When quite young I can remember I. had no thought or wish of surpassing others. I was rather taken with a liking of little arts and bits of learning. My mother carefully fostered a liking for botany, giving me a small microscope and many books, which I yet have. Strange as it may seem, I now believe that botany and the natural system, by exercising discrimination of kinds, is the best of logical exercises. What I may do in logic is perhaps derived from that early attention to botany. My Uncle Richard also gave me Henslow's *Botany*. He presented me

with certain bookbinding tools, which I had the greatest pleasure in using or trying to use. I am yet partial to bookbinding, and shall sometime perhaps begin it again. I used to think I should like to be a bookbinder or bookseller—it seemed to me a most delightful trade—and I wished or thought of nothing better. More lately I thought I should be a minister, it seemed so serious and useful a profession, and I entered but little into the merits of religion and the duties of a minister. Every one dissuaded me from the notion, and before I arrived at any age to require a real decision, science had claimed me."

At the same time he recalled some of his thoughts about religion at this early period: "I was not without a tendency to inquire into the subject. The Gospels seemed worth more than reading; they were worth analysing and making into a rigorous history of Christ. And this I actually undertook to do. While living in Chatham Street, perhaps about the year 1850, I began the work during the quiet of Sunday afternoons in my small bedroom, where I had a very diminutive table, with an inkstand and a few little things in a study-like array. By noting down the facts as stated in the Gospels, and comparing them and arranging them in chronological order, I intended to form a regular Life. But altogether, apart from any difficulties which older persons might meet, I found the task very perplexing for my then powers. What most impressed the work on my memory is that the second or third Sunday my father appeared suddenly in my room. As this was at the very top of the house, and he was usually sitting during the afternoon after dinner in the parlour, I expect he must have missed me and come to see my occupation. But finding me writing, he pressingly inquired the subject, which I was at last almost forced to confess, to my entire confusion and dismay."

Of his secret aspirations during his school life in London he wrote at the same date: "It was during the year 1851, while living almost unhappily among thoughtless, if not bad companions, in Gower Street—a gloomy house on which I now look with dread—it was then, and when I had got a quiet hour in my small bedroom at the top of the house, that I began to think that I could and ought to do

more than others. A vague desire and determination grew upon me. I was then in the habit of saying my prayers like any good church person, and it was when so engaged that I thought most eagerly of the future, and hoped for the unknown. My reserve was so perfect that I suppose no one had the slightest comprehension of my motives or ends. My father probably knew me but little. I never had any confidential conversation with him. At school and college the success in the classes was the only indication of my powers. All else that I intended or did was within or carefully hidden. The reserved character, as I have often thought, is not pleasant nor lovely. But is it not necessary to one such as I? Would it have been sensible or even possible for a boy of fifteen or sixteen to say what he was going to do before he was fifty? For my own part I felt it to be almost presumptuous to pronounce to myself the hopes I held and the schemes I formed. Time alone could reveal whether they were empty or real; only when proved real could they be known to others."

CHAPTER II.

1851–1854.

IN October 1851 Stanley returned to London to attend classes at University College, and he was fortunate enough to find a home in the house of his aunt, Mrs. Henry Roscoe, who then lived at 9 Oval Road, Camden Town. Here he remained all the time that he was at University College, and he was very happy, for besides his aunt's kind care, he had the companionship of his cousin Harry (now Sir Henry Roscoe), with whom he formed a lasting friendship.

At this time his favourite study was physical science, especially chemistry, and at Easter 1852 he received at College the silver medal for chemistry, and at Easter 1853 the gold medal for the same subject. In 1852 he also received the first prize for Experimental Natural Philosophy. In July 1852 he matriculated at the University of London, and took honours both in chemistry and botany.

Soon after receiving the silver medal he wrote to his father: "I am very glad that you were so pleased about the medal, as I see from yours and Lucy's letters, but I have no intention of trying very hard or injuring my health at all to get any more—that is, any more prizes, though, of course, I shall try to learn all I possibly can while I have the opportunity at college. If a person goes into an examination people are always disappointed if he does not come off one of the first, and for that reason I was rather sorry after I had gone into the chemistry examination, as I had no right then to expect anything more than one of the last certificates. I am afraid now that you will be disappointed at my not getting anything at the college examination in

June, for though I may possibly get a certificate in Greek, and *possibly* either in Latin or mathematics, I have no chance of any prize, and this is literally true as far as I can judge at present. As to the matriculation, I shall *try* to pass in the first division, and if I pass the examination at all, I shall probably try to pass the examination in honours for chemistry; but you must not expect any prizes here either."

To his sister Lucy, before he knew the results of the matriculation examinations, he wrote: "I daresay you will want to hear about the matriculation, and so I will tell you that it has all gone off very well. . . . I am not at all afraid of being plucked, and the only thing that I think will put me in the second division, if I am so, will be the history, for all the examinations were much easier than those at college. . . . I have not told you, I think, that I was invited by a student I know at college named Colvill, the nephew of Dr. Sharpey, with whom he lives, to go and get tea there. . . . He is a very nice old fellow, and one of the best physiologists alive. He attended Mr. Graham's class this year with all the other students, and since Easter has been working all day in the laboratory, with Dr. Williamson telling him how to do the things. You must not complain of me making messes and blows-up in the cellar if an old chap of sixty begins to learn to do it. I am going to bring out something fine next holidays in the chemistry line!"

Early in January 1852 his grandfather, Mr. William Jevons, had died at his father's house, at the advanced age of ninety-one, but Stanley was not at home at the time, as he had remained in London for the Christmas holidays.

During the summer vacation of 1852 Stanley began to keep a journal, the first entry dated is the 23d August 1852: "The college lectures ended on the 15th of June, and the examinations in mathematics, Greek, and Latin —for the chemistry ended at Easter—were finished on the next Monday. The mathematical exam. was six hours long, while the chemistry one had been eight, but nevertheless the mathematics tried me far more, and before the end I got quite stupid, to which I must partly attribute my low place. Soon after was the distribution by the Earl

of Carlisle. My certificates were fourth in Latin, fifth in Greek, and sixth with Colvill in mathematics.

"The matriculation was to begin on the 6th July, and till then of course I worked hard; I had got up all the Latin and Greek for the college exams., and so attended chiefly to English history and grammar, chemistry and botany. It was only a few months before that I had begun to think of going up in botany, and considering that I did not know any more than I had learned from reading a few small 'Introductions,' etc., and Henslow's *Botany*, with my botanising at West Kirby for six weeks, it was rather adventurous. But I went over the orders again, and learnt Lindley's *Elements*, and wrote home for Henslow's to read again. In the chemistry I learnt the inorganic exclusively, as that only is required in the pass. Sam Archer now came to stop with us to pass the matric. The examinations were from ten to one, and from three to six on the 6th, 7th, 8th, and 9th of July. The first exam. in mathematics I did only pretty well, and the history in the afternoon decidedly badly, so much so as to put me into rather bad spirits, but all the rest was very easy, and the geometry and grammar were the most pleasant of all. I had to try most of course at the chemistry on the second afternoon, and was satisfied with what I did. The natural philosophy on the third afternoon I missed. In the two hours between, Sam and I went to a coffee-house, where we looked over a book, or learned off our notes for the afternoon; but the heat, everywhere indeed, was most tremendous.

"On the Saturday, after the exams. were finished, Sam and I set off for an excursion to Epping Forest. We went by railway to Tottenham, from which we walked very slowly to the River Lea. There we had a two hours' row on the canal, which was rather a new thing to me. We found the walk to the Forest rather longer than we expected, and did not reach it till nearly seven, though we had set off at ten in the morning. The Forest was a splendid place, and quite wild, though the trees are very small; but we could not stay long from the lateness. We then walked to Chigwell, which I wanted to see very much, as it is a part of the scene in *Barnaby Rudge*, my favourite novel; but we missed seeing

the Maypole, which I believe really exists, and is called Queen Elizabeth's Lodge. We got to Chigwell at eight o'clock (!), and considering we were ten or eleven miles from home, without any prospect of getting an omnibus, and very much tired already, we were rather alarmed, but set off at once, determined to walk it. We reached Bow after ten, but fortunately found an omnibus just starting, by which we got to St. Paul's, from which we walked home, considerably tired. The country was very beautiful, and in the naturalising way I found several new flowers, and a glow-worm for the first time.

"On the Monday I set to work seriously for the honours, having few doubts of passing in one of the divisions. I worked chiefly at home for about seven or eight hours a day, and finished nearly all I intended by the 23d—the day of examination. In the chemistry I really believed I should do very badly, and in the examination I actually felt quite lazy and careless! But the botany examination in the afternoon of the same day was far more interesting. I wrote concisely, and therefore I suppose well, though I made several mistakes. The question on the chemical products of assimilation I did easily of course, as I had learned it in the chemistry. Sam went in for zoology with four others, while I had only one other, named Turner, who like me went in for chemistry. I got home with a bad headache, but managed to get to the 8.45 mail train, by which I got to Liverpool at four in the morning, and after spending the day at Chatham Street, I went over to West Kirby with papa in the afternoon.

"I set to enjoy myself as much as possible in one week, for I found that they were going to stop only one week more, and not ten or fourteen days. I had expected to be able to press nearly ten plants a day, having brought proper paper with me, but I believe I did not do more than one a day fit to keep, which is not surprising when I did not know how to set about it. The country was very pleasant certainly, and the weather pretty fine except on the Monday, and I enjoyed three or four bathes with Tommy very much in spite of the bad shore. One day we went an expedition to Hillbre Island, where Tommy, Henny, and myself spent most of the time in *catching crabs*, but I also got six new

kinds of seaweeds and several plants, including the fern *Asplenium marinum*. The rest of the time I spent pleasantly, sometimes lazily, in walking about the hill, sandhills, etc., but I was not in the best spirits.

"On again reaching Chatham Street the next Saturday I felt completely at a loss what to do first of the many things I intended to do. I began, however, on the Monday by clearing out my work bench, which with the bottles, cupboard, etc., I found in a very dirty state. It was a long and unpleasant job, but I made it very nice in a little time, putting all the glass apparatus in a box by themselves, so as to be out of the way. The only thing I did in chemistry was to put some salts to crystallise on the kitchen chimney-piece, but they have not succeeded at all, and to make some acetic acid from old sour beer.

"I at last began my herbarium by buying three quires of foolscap paper to put the specimens on, cheating myself as usual by buying it at 1s. a quire when much cheaper paper would have done equally well. I soon after bought six feet of half-inch board fourteen inches wide to make the shelves, in which and other things I was chiefly occupied till within the last few days."

The next entry is dated the 26th of August: "My chief, almost exclusive, occupation lately has been botany. The herbarium is now nearly finished, for I have put shelves in one compartment, as much as I am going to do these holidays, made the covers and labels for all the orders I require now, and mounted most of the specimens I have yet got, in number between fifty and sixty. I have also pressed a good many, chiefly out of the Parliament Fields, where there are yet enough to last me some time. I got several also by an expedition to Upton and Moreton with Sam Archer, and I got several garden plants too. I have not altogether omitted the less agreeable part of botany, the learning of the orders. I did not mention, I believe, last time that on Saturday night I heard for the first time that I had got the prize in botany at the matriculation. Turner is the name of the other one who went in with me, and he has passed too, and also has got the prize in chemistry, in which I am second with another person.

"I have often thought much about what is called cleverness and genius. The oftener an action is repeated, the more easy is it to perform it again, and the more perfectly will it be performed. It is by long repetition that workmen or jugglers acquire such perfection, and the only credit given to them is for their diligence. But I think that is exactly the same case with students, for if they have been accustomed for a long time to study diligently, but particularly *in a good way*, they get *practised* or *clever* in acquiring knowledge, while those who have been lazy or have studied in a careless manner cannot expect to become expert in it. I know that at least since I went to Mr. Beckwith's I have worked pretty hard, and I am very sure that if I had not I should never have got the prizes I have. By this time, perhaps, I have become more practised in acquiring knowledge than some others who have not attended to study, and this it is that constitutes all the cleverness I may have. . . .

"*Friday, 3d September.*—On Tuesday I went with Sam Archer to get some shells from the bottom of ships in the graving docks. I got three kinds and a seaweed. Wednesday was my birthday, when I became seventeen, but I began the day in an unusually bad humour. I began a letter to Aunt Jane, of which, however, I could finish only a few sentences, and had hard work in keeping my agreement with Sam Archer to go to Crosby. We set off all right, however, and at the railway I met a man named Sanson, who is a very good botanist, though a custom-house clerk, and I should like to know him. We wandered about the Crosby sandhills for several hours, and I got a good many rather nice specimens, as *Triglochin palustre*, *Gentiana amarella*, *Parnassia palustris*, *Anagallis tenella*, *Echium vulgare*, *Euphorbia paralias*, *Euphrasia officinalis*, *Spergula nodosa*, etc., and Sam found some willows, with numbers of pretty good caterpillars, hawks, and pusses. I got home at six, got my tea, pressed several plants, and had to get ready immediately for the Philharmonic concert, but as I had to sit by myself, and was, moreover, in a bad humour and tired, I enjoyed it but little, as I expected. It took all Thursday morning to examine and press my plants, in which, however, I succeeded better perhaps than I have ever done before.

"Last night I spent chiefly in sorting what few shells I have. . . . This morning I walked along the docks a little, and was fortunate in finding some large foreign snail shells on some dye-wood. I am going to set to work to-day at arranging the minerals, and have got the cardboard for the boxes."

On the 24th of September he writes: "I have let a long time pass over without any entry, and had once indeed resolved to give up my Journal. But I daresay I shall find it easy to write regularly when I am working hard at London, for my energy is like that of others I have heard of, never excited but by pressure and difficulties. For instance, during the whole of these holidays I might easily have done two or three hours' work a day at lessons and got a great deal done, but I have not done so for more than a week altogether. I am, indeed, very much vexed at having done so little these holidays, for during two months I have only collected about fifty or sixty plants, arranged them as an herbarium, arranged my minerals, gone a few excursions and walks with Sam Archer, read grandpapa's life, and done some few other things hardly worth mentioning. During the same time at college I have no doubt I could have done as much while attending regularly to all my classes. I think this will be the last opportunity I shall have of wasting my time, for till next July I shall be at college almost continually, and then (after a short time in the country, I hope) I shall go at once to business, and need not hope for any more holidays for some time.

"The idea that I have formed of the manner of spending the next few years, though of course I cannot expect that it should turn out half as I like, is to devote this next session at college to learning as much science as possible, especially natural philosophy, mathematics, botany, and chemistry, the last perhaps less than the others, because I am more advanced in it. I shall spend some time also in walking over London, especially the remote and low parts, and during the season taking walks and excursions into the country to collect plants for my herbarium. After a short tour, most likely among the Lakes, on which I shall collect plants, I suppose I must begin some business directly, the nature of which

does not matter so much, but as far as I know at present, I should like that of a general broker, since there is more variety. The office, meals, etc., will occupy me from about eight in the morning till seven in the evening (though no doubt I could devote at least an hour of *that* to reading, particularly if it is light reading), and there will be left for real study at least two hours in the evening and one in the morning. I shall thus work for about eleven hours a day, but the eight of them spent at the office will not be nearly so fatiguing as the seven or eight at college, while the study in the evening will become, I expect, more a pleasure than a trouble. Of this study only a little will be given to science, and the rest to Latin, Greek, history, French, or German, etc. This appears a grand but practicable scheme, but I must be prepared to see it frustrated at any time, and to find it a far less easy job than I had expected—to accustom myself to going to business in the middle of the noisy town for nothing but to write out dry letters, invoices, etc., run errands, and the like. But it has been done before under harder circumstances.

"I have done very little during the last few weeks worth mentioning. My minerals are most of them in neat boxes, and some of them with names. I have added about twenty new specimens to them, many of them pretty good, as iserine, several iron ores, two carbonates of copper, obsidian, etc., but I hope to get many more in London. I think I shall take a vow to spend the whole of the Christmas holidays in learning mineralogy and crystallography, and finishing the arrangement of my collection by putting a paper to each specimen telling its name, composition, form, and a little of its history. I shall buy the minerals chiefly which are mentioned in the chemistry, and study these chiefly, and thus shall be gaining something useful for the examination at Easter.

"I have collected very few plants lately. One or two days I spent in making up some stray sheets and plates of Roscoe's *Monandrian Plants* into four copies as complete as possible. The first, the most perfect that can be made, has all the printing, but wants nineteen plates, some of which Lucy will copy for it. I have, of course, looked well

through the book in doing this, but though it is very splendidly executed, 'I should think it was not of much use as a botanical work, since grandpapa's arrangement is not mentioned in the *Penny Cyclopedia* (Art. 'Scitaminaceæ'). He has made also a great mistake in defending the Linnæan against the natural system. The former is no better an arrangement of plants than that would be of animals which made the classes depend on colour, as the white class, red class, brown class, etc. It might often happen that all of one natural class were of one colour, and were in one class of this system, as sometimes happens in that of Linnæus, while the variations in colour of single animals scarcely exceed those of plants in the number of the stamens and pistils. Linnæus has acknowledged the imperfection of his system by making the classes *Didynamia* and *Tetradynamia*, which are nothing more than natural classes."

He returned to London at the commencement of the college session in October 1852, and continued his journal throughout the winter. On the 23d October he writes: "I am now fairly at work again for my last session, and shall try to get through a good deal of work, but rather with the intention of enabling myself to go on easily afterwards than of finishing up. During the first week and a half I had only chemistry, but though this took very little time, I got through little else, except reading the first three chapters of De Morgan's *Trigonometry*, and a few other things. In chemistry I began by reading the subject of the lecture up in a number of books, as Graham's *Chemistry*, 'Heat' in *Encyclopedia Metrop.*, *Library of Useful Knowledge*, etc., but I found that while I got but little new from so many, it confused me very much, so I have left it off. In reading difficult mathematical things I found that the best way to make them out was to go over them very carefully for two or three days together, instead of puzzling yourself for several hours to understand one sentence or one mathematical transformation.

"On the 15th, Thursday, was the introductory lecture of the arts, by Professor Clough, on the Literature of England, but I did not make much out of it. The next morning I attended De Morgan's higher junior, and had the usual

lecture on our necessary notions of ratio, with which he always begins. Professor Potter in the afternoon gave us an introductory lecture on Force, as the universal agent, as in motion, heat, electricity, chemical action, etc. I also began the long job of copying out De Morgan's tracts, with those on ratio. I intend to do them all, as they come out in my classes, because I think that whenever I work at any of the subjects again I shall miss them very much; I also intend to have all De Morgan's books.

"A few days after I got here I went to the university at Somerset House, and got my three certificates for the matriculation and an order to the bookseller for my prize-books. I had to go several times to the bookseller, Richard Taylor, but at last fixed upon Regnault's *Cours de Chimie*, 4 vols., 21s.; Schleiden's *Scientific Botany*, 21s.; and Lindley's *Vegetable Kingdom, with Glossary of Botanical Terms*, about 35s. The rest of the £5 being taken in the binding.

"I have had several rather learned discussions with Harry about moral philosophy, from which it appears that I am decidedly a 'dependent moralist,' not believing that we have any 'moral sense' altogether separate and of a different kind from our animal feelings. I have also had a talk about the origin of species, or the manner in which the innumerable races of animals have been produced. I, as far as I can understand at present, firmly believe that all animals have been transformed out of one primitive form by the continued influence, for thousands, and perhaps millions of years, of climate, geography, etc. Lyell makes great fun of Lamarck's, that is, of this theory, but appears to me not to give any good reason against it.

"31*st October*.—I have been working steadily all this week at college. I have worked full nine hours a day, chiefly at mathematics, which I get to like more as I attend to it better. We have just finished what we are to do at present of double algebra and series, which I think rather interesting though hard. In the higher junior class we have been at ratio and fractions. I have finished copying out the four tracts on ratio and the one on series.

"The chemistry has been going on very slowly and stupidly, for we are only as far as gases, although we have

gone over the last few subjects very quickly. The best way to do well in the examination will be, I think, to work up the whole of Graham, and some out of Regnault, etc., well, a week or two before.

"In natural philosophy we have got to levers, but I do not like either the class or the present subject much. I have gone through the subjects in Potter's book.

"By myself I have given most of my time by far to mathematics, and have done nearly all the exercises for both classes. I have nearly finished reading Buff's *Physics of the Earth*, and have also been reading the introduction to Regnault's *Chimie* on crystallography, which I intend to study in the Christmas holidays. I think I shall try to make wooden models of the crystalline forms, and a Wollaston's goniometer. I have bought a few minerals since I came, but have chosen them badly. I shall spend about five shillings more on them before Christmas, and get chiefly those which are mentioned in the chemistry.

"I have long had a curiosity about the dark passage and arches between the Strand and the river, so, having read 'The Strand' in Knight's *London*, I went on Friday. The first thing I saw worth mentioning was the 'dark arches' under the Adelphi, but the first time I only looked in, and was afraid of going farther. Then after having a look at the Savoy Chapel, the only remains of the old Savoy Palace, I got down to the river below the arches by one of those extraordinary passages to the boats, and took courage to walk up through the arches. There were some women in them then, and I read a little time ago in a newspaper of some women who were found almost starved in them.

"Yesterday I made one of my excursions to Spitalfields. I walked to King's Cross, from there by the New Road and City Road to Finsbury Square, through Cannon Street to Bishopsgate Street, and from there into Spital Square. The appearance of the houses from the first was rather peculiar, and the greater proportion of the houses have the large weavers' windows running the whole width of the house, for the top storey at least. It was some time, however, before I found any of the wretched places I have heard so much of. One narrow lane was the worst, I think, that I ever

saw; almost every house had a dirty piece of paper in the patched and dirty window, with 'Lodging for single men,' at 2d. or 3d. a night. The chief rooms of the houses, opening of course to the street, were very small and exceedingly dirty, and by the light of the fires, for it was getting dark, I could see that there was nothing but a narrow bench or two inside. Nothing looks more unwholesome, also, than the crooked little back doors leading into a few filthy square feet of yard behind each house. There were a few of the bird traps on the tops of the houses so characteristic of the Spitalfields weavers.

"But I was most astonished *at the great many improvements that are going on there.* One wide road appeared to have been lately cut right through the worst part, and on either side I had an opportunity of seeing the backs of the houses over the empty spaces where other houses had been removed. In almost every street there seemed to be some building, and south of Spicer Street I came upon a whole batch of model lodging-houses, called 'Metropolitan Chambers,' with churches, schools, etc., around them. In another street I saw very clean, new, and handsome, though small, swimming-baths. The people often looked exceedingly wretched and destitute, but quiet and peaceful, and not the blackguardly set that you generally see. I shall go again soon.

"This afternoon I took a walk all over Westminster, beginning at Charing Cross, down Whitehall, past the Houses of Parliament, and as far as the Millbank Penitentiary, where I turned up through the poorer parts. There were several rather dirty narrow places, but great improvements are going on there also, such as the making of a grand new road, the Victoria Road, through the worst parts.

"*Sunday, 7th November* 1852.—I have little to put down this week, for I have done little but work quietly at college, mathematics chiefly, and we have been doing series—the binomial theorem and logarithmic series. In the higher junior we have just finished the fifth book of Euclid. I never feel satisfied with my knowledge of anything unless I have gone over it connectedly and systematically, and so

I am writing out the fifth book, shortly but distinctly, with De Morgan's proofs. In the chemistry we have had three or four lectures from Dr. Williamson instead of Graham. The subjects have been oxygen and hydrogen, and I have read them up in Regnault, as well for the chemistry as the French reading. In natural philosophy we are near the end of the mechanical powers; it is very necessary to know all this mechanics, of course, but there is very little interest compared with what there is in any of the parts of chemistry. The history class by Professor Creasy began this week, and we have had three lectures from him already, from half-past eight to half-past nine in the morning. It has been chiefly about Grecian history, and will be for several more days, I expect. I think I shall be interested in it, and though I shall read pretty much, I cannot expect to do well in the examination. I shall read a good deal of history after leaving college.

"*Monday, 15th November.*—Yesterday I explored Clerkenwell. I walked to King's Cross and by the New Road, Hamilton Row, Bagnigge Wells, Guildford Place, and Coppice Row to Little Saffron Hill. This I went down till near Holborn, when rather frightened by the appearance of the inhabitants of pickpockets, I dashed to the left and got to the site of Hicks Hall in St. John's Road. From there by St. John's Lane up to Clerkenwell Square, Jerusalem Passage, and Clerkenwell Green, where the Session House is. After examining this as well as the Close, Red Lion Street, and the surrounding neighbourhood pretty well, I struck out north, and having got as far as the neighbourhood of Northampton Square, which is, I believe, a good specimen of Clerkenwell, I returned by much the same way as I came. Clerkenwell seems to be the seat of a great many little manufactures, besides watchmaking, such as work-boxes, jewelleries, gems, musical boxes, etc. The genuine Clerkenwell has a quiet respectability and industrious appearance, and must be carefully distinguished from the neighbouring rascally parts, which are the headquarters of the pickpockets and thieves of London.

"*Sunday, 19th December.*—The last Sunday before Christmas has now come, and I must conclude my account of this

term before turning my thoughts to the Christmas holidays, and to home, which last, however, I hope they seldom leave.

"I have no walk worth describing this time, partly because the dark comes on so soon in an afternoon now, and partly because I have been pretty busy at home. I made an attempt at a walk through Bermondsey the Sunday before last, going to Fenchurch Street by railway, and walking across London Bridge; but it was nearly dark when I got there. The narrow dirty streets looked so lonely that I was frightened, and made my way as quickly as possible to Westminster Bridge, and so home.

"On Wednesday I went for my botany prize-books from the university, and was very much pleased by their handsome appearance. Regnault's *Chimie* I have been reading a good deal lately, and I have nearly been through the first volume; but I hardly like it as much as I expected, as it is chiefly on the practical, not the theoretical part.

"*Sunday, 16th January* 1853.—Christmas and the Christmas holidays have passed since my last date, and I am again settled down for three months', perhaps six or seven months' hard work. The last lectures at college were on Thursday, 23d December, and on Friday morning at half-past six I left for home with Harry, who was going to stay a week or two with the Booths. I got home to dinner, and found everything as usual, except that there was Herbert in addition. Lately, I have found myself thinking more and more of home, and now it is settled that this is to be my last half year in London, I think more of it than ever, and feel a kind of anxiety that the time may pass as quickly as possible, and that there may be no alterations of any kind in that home. My wish to be at or near home has been one of my reasons for choosing a common business in preference to any profession or other occupation, and I have felt as if it savoured of selfishness to leave home altogether and go and take care of your own interests at some place a long way off.

"It is now, however, settled finally, I hope, in my own mind as well as in papa's and Lucy's, that I am to go into some office at Liverpool. I have had doubts whether it will not be exceedingly difficult for me to acquire ready business habits, but I think that after setting my mind upon it for a

year before, I shall have sufficient determination to do it. In every other respect I believe that my two years' colleging in London will be a great advantage even in business. One necessary will be that I should not think of my business in the day-time and my work at night as on an equality, but the latter as altogether subordinate, at least for a long time; not that I think it actually of less importance to success. My plan of work, as far as I have thought of it as yet, will be this: for the rest of this session I will give almost all my attention to the following, and in the order in which they are mentioned :—mathematics, chemistry, natural philosophy, botany, crystallography or mineralogy. For several of the first years that I shall be at home I shall also give most of my leisure time to science, because I know that to do a thing well the mind should be engaged with it as singly as possible, that is to say, when you are thinking much about such things as the theory of equations, diffusion, the atomic theory, relation of the forces, etc., the mind cannot take such interest in, and therefore cannot so well learn, history, or Latin and Greek. The case is quite different, I believe, when you are working for prizes or a degree, and not for the sake of the knowledge.

"I shall, however, as soon as I am at home, begin to work a little at French or German, and I shall, of course, read more novels and common books than I do now. I shall also *amuse* myself down in the cellar with chemical experiments, making instruments; which, however, I think are not altogether useless amusements. After those years are past, and when I shall be a man at twenty-two or twenty-three, I shall make a gradual transition to literary studies, and especially history, though always keeping up my scientific knowledge a little. I don't know how far I shall be able to learn any mathematics by myself.

"So much for all my grand schemes and anticipations, which will be upset most likely some fine day. I passed the Christmas holidays better perhaps than most of my holidays on former occasions, but perhaps because there was not time to get into my usual lazy way. We had the usual Christmas dinner at our house. During the next week I set my bench in order and began my 'reflective goniometer,' which

I had had in my head for some time. I made it entirely of soft mahogany, zinc plate, and a few brass screws, but it has succeeded, and is correct, I believe, to the tenth of a degree. I had nearly knocked under to making and graduating the dial, and I did not finish it till the last day of the holidays.

"I played the organ a good deal, especially out of the *Messiah*. The New Year's Day dinner at St. James' Road was decidedly pleasant, and well finished up by a good game at blind man's buff. Almost every party I go to makes me like dancing parties worse, but other ones rather better, so I think I shall *never* be a dancer. I spent a part of two evenings in looking over half of Mr. Archer's collection, and I saw Philips, the great mineralogist, at the Medical Institution. I also bought three shillings and sixpence worth of minerals from Wright, chiefly forms of carbonate of lime.

"*Sunday, 23d January.*—Since I came to London at the beginning of this term I have chiefly kept to my work, and have therefore little worth putting down. I have been twice to the British Museum, and find I can take as much interest in the sculptures and other antiquities as the minerals, etc.

"I have been wanting very much to get Mayhew's *London Labour and London Poor*, as that is the only book I know of to learn a little about the real condition of the poor in London. I managed to root out a dozen of the numbers in rather a dirty condition in a shop in Holywell Street, and yesterday I bought them at a penny a piece. They will lead, I expect, to a few walks this term.

"Last Friday I had a great treat in attending one of Faraday's Friday evening lectures at the Royal Institution. . . . As to college affairs, I am going on steadily and just as usual. In mathematics we are just beginning the theory of equations, and during the last week have got through Descartes', Fourier's, and Sturm's theorems of the limits of the roots of equations. They are the most truly difficult things we have come to, and I do not thoroughly understand them yet.

"It is only about two months to the chemistry examination, and I am beginning to think seriously of it. The best way to learn the metals thoroughly I think to be to make a large table containing the composition, preparation, crys-

talline form, etc., of each metallic compound. I began the table last night. (It turned out a failure.) I have been reading a good deal of Regnault's *Chimie*, and a little of Daniell's *Introduction to Chemical Philosophy*, which, however, I think a poor book.

"In the chemistry class we have only just begun the metals, as we are very late; we are to do the metals and the organic together, which I do not think a good way. Before the examination I shall read most of Graham, some of Liebig's *Letters*, work at parts in Gmelin's *Handbook*, read a good deal of Regnault, etc.

"In Potter's class of natural philosophy we have been engaged since the beginning of the term with electricity. He does the experiments magnificently, but gives us a minimum of all theory, which consequently I have to read for myself. I must read and work an awful deal for this class after Easter.

"I now and then read a little of Schmitz's *Greece*, but I get on very slowly, and shall not go into the examination.

"*Sunday, 30th January.*—On Friday night I was again at a lecture at the Royal Institution by Dr. Williamson. The title was 'On some recent Discoveries in Organic Chemistry.' At college we have been doing very hard things in the theory of equations, which puzzle me awfully. In natural philosophy we have finished electricity and begun voltaic electricity. I have nearly finished reading electricity in *Library of Useful Knowledge*, am half through Sir Snow Harris' *Electricity*, and am at the same time reading in chemistry two volumes of Regnault, Liebig's *Letters*, now and then a little of Graham, Schmitz's *Greece*, etc., more than I have read for a long time.

"*Sunday, 27th February.*—I have now a whole month to make up, although several important things have happened, which I ought to have put down long since, and would have done perhaps, if my last one or two Sundays had not been rather engaged.

"Soon after the beginning of this month we heard that my uncle, F. Hornblower, was very ill of rheumatic fever, and as he had for some time been very poorly and weak, it was considered dangerous. In a day or two he died, from

the complaint reaching the heart. This news was particularly sad on poor Aunt Jane's account. His funeral was from our house at Liverpool. Aunt Jane has been living there ever since, and I should think will continue to do so as long as she lives. I have known Uncle Hornblower better than any of my uncles, almost as much more as I have known Aunt Jane better than any of my aunts, and he has always been particularly kind to me. Several years ago (I think about five or six) I used to dine every day at his house in Falkner Street, at the opposite corner to our present house, while I was at the Mechanics' Institution. Since that I have spent many weeks at his house at Nantwich, which have always been very pleasant ones. The last time was in October.

"About the middle of the month I received from papa one of his business-like letters, which I like to get better than any others, on the important subject of 'What I am going to be,' as the phrase is. I had before made up my mind to be in some commercial business, but in this letter he advised me to choose some one which I should be more able to like for itself, and proposed the iron trade. This letter, of course, set me to think very seriously, as now one of the greatest questions of my life was to be settled once for all. I had before thought of some of the reasons which he gave, and having had the same advice from several other people, I was not long in fixing to be a manufacturer of some sort, putting, however, an ironmaster's business out of the question, because it would not suit me at all well, and would, besides, take me from home for the rest of my life. Now, however, I have the great pleasure of thinking that, as far as can be known at present, it is determined I shall not be away from home more than six or seven months longer. It can hardly be conceived, I think, how many pleasures, and still more how many real advantages, I should have lost by leaving or, I may say, losing my home at once. The choice now is between a sugar refinery and a soap, chemical, or some other sort of manufactory, and an indispensable condition is *that it be in Liverpool.* I shall probably go into the Birkbeck Laboratory next term.

"About a week ago there was a rather hard frost, and

skating began vigorously as soon as the ice bore. On Saturday, 19th, I skated for two hours on Regent's Park, where the ice, however, was very bad, and in the afternoon for about two more on the Serpentine. At the latter place I enjoyed it especially, as, besides plenty of tolerably good ice, there were crowds of people everywhere, which always, I think, increases the fun, and the excitement now and then of somebody falling in and getting saved by the Royal Humane Society's men. On Sunday I went with Harry to some ice near the railway station at Barnes, where we skated for some time. The Monday before last we had some capital fun at college with snowballs, chiefly in the storming of the portico, which was defended by another party of the students. The medicals had a fight in the streets with blackguards, which ended in rather a serious row.

"On Friday, 18th, I went over a lucifer match manufactory, which I thought very well worth seeing, though it was a dirty low hole. Harry wanted some specimens of matches in different stages for a lecture which he gave last Monday at the Spicer Street Domestic Mission, 'On the Use and Importance of Chemistry, illustrated by the improvements it has produced in lucifer matches, bleaching, and other things.'

"I have got into a rather lazy way of working lately, partly, I think, on account of the skating, etc., but am going to set to work seriously for the chemical examination, which is only a month off; we are now going through the organic and the metals at the same time, on different days of the week, and get on very well. I had hoped that when we began algebraical geometry, as we have done now, we should have had a little rest in mathematics, but the exercises seem only to get harder and harder. The natural philosophy also is very dull, being on hydrostatics, and, worst of all, the history class begins to-morrow morning at eight o'clock.

"I have been one or two good walks lately, chiefly among the manufacturing parts. One Saturday I went from Waterloo Bridge eastwards along the wharfs on the Surrey side, as far as Jacob's Island, which I found much improved since I visited it about a year since. The ditches had been filled up or arched over, and the streets were

beginning to be filled. Another Saturday I started from the same place, but travelled west as far as Vauxhall Bridge, where I again crossed the river, and proceeded again in the same direction nearly to Chelsea, whence I walked straight home. Belvedere Road is full of small wharfs and manufactories, such as drain tile potteries, gas-works, slate-works, bone-mills, glue, whiting, etc., manufactories. Yesterday afternoon I accomplished still more. Starting from college a little after two, I walked through the city and along Whitechapel and the Commercial Road almost to the West India Docks. I then turned up, and passing a good many manufactories, reached Bow and got home by railway. I feel as if I could see nothing with so much pleasure now as a dirty pearl ash manufactory or tar distillery. I have remarked that in Bermondsey, Tower Hamlets, and most of the parts east of London Bridge, the streets are wide and open —showing, I suppose, that land is cheap—but that the houses are very low, not always unhealthy or dirty, seldom more than two low stories in height. These parts are very low and wretched, but are not, as far as I could see in the day-time, half so full of busy vice and crime as St. Giles, Drury Lane, etc.

"*Sunday, 3d April.*—On the 12th March I had a pleasant walk from London Bridge through the close parts of Bermondsey and among the tanneries, till I came into the middle of the market gardens. I went down Blue Anchor Road, and returned up the Deptford Road to the Thames Tunnel, whence I came home by the railway.

"Before Easter we were going through the conic sections in the mathematical class, and I kept up pretty well in them till near the end, when I partly left off working at mathematics that I might have more time for chemistry. In natural philosophy we went at a great rate through pneumatics, the air-pump, the steam engine, heat, and part of acoustics, to none of which I attended much, except the last, for which I am reading a little.

"A few weeks before Easter I got a letter from papa with some money, and asking me to go to Liverpool for the Easter holidays. I was very much astonished at it, but of course said immediately that I would, though I should not have more than a week.

"Thursday, the day before Good Friday, was the first day of the holidays, so on that day I went down. I had a comfortable journey, reading all the way nearly the whole of 'Les Corps Gras,' in Regnault. I did not find the house turned so much topsy-turvy by Aunt Jane's illness as I had expected, and everything seemed as cheerful as usual. I soon found, however, that music was not allowed, and, in fact, neither the organ nor the piano were opened all the time I was in Liverpool.

"The greater part of the first morning I spent in a walk with Tommy at Birkenhead, but I began a few chemicals, practising a little at crystallising on nitre. On Saturday morning I went with papa to call on a Mr. Nevin, the manager of Steele's Soap Works in Sir Thomas Buildings. Papa had seen a letter of his in the newspaper on penal jurisprudence, so he sent him one of his books, and getting to know his address, called on him. Sunday morning to chapel, and the rest of the day at chemicals.

"On Monday morning Willy Jevons and I went over the soap-works with papa. On Tuesday morning I went over an iron shipbuilding yard at Birkenhead with Willy and Uncle Timothy. The punching and shearing were neatly done, but the carpentering machines were not at work. Mr. Steele's head clerk, Mr. Nevin, had given me a letter to see a soda-works of his at Prestatyn near Rhyl, and on Wednesday papa and I went to see them, and it was fixed that I should go straight to London from Chester. We crossed to Birkenhead by the 9.45 boat, and got to Prestatyn about one, going by railway to Chester, and from there by the Chester and Holyhead Railway along the Wales shore of the Dee. We saw over the works very completely, and I got specimens of the materials and the soda ash in different steps of the process. The process was almost the same as I had learnt it from Graham, but the only way to gain a good idea of the manufacture is to see it. After dinner we returned to Chester by the railway, and papa there left me, while I went on at six to Crewe, passing Beeston Castle and the Nantwich station. From Crewe to Birmingham I went by the South Staffordshire Railway, except between Crewe and Stafford, passing through the

middle of the iron district, where there were numberless iron furnaces, two or three together, blazing away on either side of the railway, and lighting up the sky; this part of the journey was long and troublesome, but pleasant, because it was new to me. Getting to Birmingham after ten, I found that the train for London started from another station, and I was perhaps nearly an hour walking about the streets (which did not appear to me at all fine) to find it. I then exceedingly enjoyed some tea and ham at a coffee-house I found open, and set off for London at 12.15, getting home without further trouble at about five in the morning, having been out quite eighteen hours, the greater part too on the railway.

"Till the next Tuesday I had none but the chemistry class to attend, and I had then great doubts whether I should go into the chemistry examination or not. At last I resolved I would make an effort and go in, come what would, and the result was that I answered the eleven questions in eight hours, quite, I believe, to my own satisfaction, but I do not yet know how much to the satisfaction of Graham.

"The next day I entered the laboratory, to which I had been looking forward some time, but I did scarcely anything the first day but get my apparatus, clean my bottles, and arrange my bench. The next day I was set to try the reactions of antimony, tin, and arsenic; and after being a few days over these I had to separate them from a common solution, which I found a long and troublesome process. One day, while making arseniuretted hydrogen, I suppose I breathed a little, for I was ill and sick after it—a real case of poisoning by arsenic. After this I began the regular course of analysis, which I found far better, having merely to find out the salt in a particular solution, and then try its reactions.

"I expected Potter's class would be better when on Light, but it is duller than ever. In mathematics we are just beginning the differential calculus, at which I am going to work very hard at nights. I am seriously thinking of making an effort for both the natural philosophy and mathematical examinations, seeing how well that for the

chemistry succeeded; but I have very little time to work, and can only expect a low certificate in the latter class.

"I took my first proper botanical walk yesterday in some fields at Hampstead, where I got four *ranunculaceæ*, primroses, and a specimen of daisy. I have bought a map of the environs fifteen miles round London, which distance only I intend to be the limit of my numerous projected excursions this summer."

There is no further entry in his journal until the 29th January 1854, when he writes: "From several causes, among which laziness, business, and the want of the book, are some, I have not written a word since last April. I must now therefore give a history of these last nine or ten months, about which I can perhaps remember now as much as I shall ever want to read again.

"During the last two months at college I attended chiefly of course to the laboratory, though working at Potter's and trying to keep up in De Morgan's. With analysis, as has always happened to me in practical chemistry, I did not succeed quite so well as I might have done, much to my own disappointment, and I had regular periods of disgust with the laboratory. I got through (rather slowly, however) nearly all the 'bottles' and did several quantitatives, which were neither very bad nor very good, which with a few preparations was all my work. But I consoled myself with thinking that it was the first three months I had learned [in the laboratory].

"I worked up well for Potter's examination, not keeping merely to what was sufficient to get the prize; and having De la Rue's electricity, I learned much more on that subject than was necessary. I had no difficulty with the mechanics, sound, light, electricity, except a little I missed in hydrostatics and a mistake or two about telescopes, but was not so much up in astronomy—a newer subject to me. On waves I answered a good deal. Mathematics was a much harder affair, of course. Some time before the examination I formed some desperate resolutions as to the place I would get, and I did work up a little. I tried very hard in the examination, but spent too much time on the hard ones, and came out fourth. Since Easter I had been thinking a great

deal of again living at home, and looked forward to it as a great happiness.

"Now came the most sudden and important change of prospects I have ever had. On Friday afternoon, about a week before I was going to leave the college and go home, Harry [his cousin, Henry Roscoe] said he had a very excellent and unexpected thing to tell me. This rather surprised me, as I hoped it would be as pleasant as good, and I was rather horrified and disappointed when he told me going home that it was the offer (as I understood it then) of the assayership to the new mint in Australia. There was scarcely anything that could be more distant from my wishes then than to emigrate, and that, together with the responsibility and difficulty of such a place, made me think at once that it was *perfectly impossible.* This I told Harry at once, and I even made him partly agree with me. I also remember congratulating myself for some time after upon the very quick and strong decision I had shown myself capable of making upon any great occasion.

"I at once, of course, wrote to papa about it, but had the disagreeable job next morning of speaking to both Williamson and Graham about it.

"Williamson, it appeared, had recommended me to Graham as the one best fitted in the laboratory for the place. I thanked them both, but said I thought I should hardly take the offer, as I did not wish to go so far from home, and hardly felt old enough for the place; but I said that of course I must hear from my father before deciding. This, it afterwards turned out, was a very necessary provision. On the Sunday I went a quiet walk, and thought but little about the affair, considering it quite impossible. Once or twice perhaps a sort of vision came into my head of independence, a large salary, and a position in society, etc., at the age of eighteen, but did not make much impression.

"Harry told me next morning that Williamson had been speaking to another student about the place, and that if I had any thoughts whatever about it, I ought to say something more decisive. I did not think that there was the slightest chance, but about an hour afterwards I got a letter

from papa asking me to consider, and saying that though he would hesitate as to my taking it if I had to leave England for good, he did not see such a great obstacle in leaving for some years together. I told this to Graham, and asked for a few days to consider and decide, and, as my father wished, packed up at once and left for Liverpool. I remained at home from about the Tuesday to the Saturday, a sufficient time, as it appeared, for me to change my mind as to the leaving home, but not to get rid of another objection, that of not thinking myself quite old enough for and equal to the position. I talked very little to any of them and they said very little to me, so that I was convinced merely by knowing what my father and the others thought, and by thinking about the thing myself.

"On returning to London I lived for a short time again at Aunt Henry's. On the Monday I saw Graham, with whom I wrote a letter of application to Captain Ward, the master of the new mint at Sydney, through whom the appointment would be made. I at once went into Graham's own assay laboratory, which I had fully expected would be the case, though it was merely from his own kindness, and at considerable expense and trouble to himself. On being taken over the rooms and seeing the quantity of particular apparatus necessary, and the numbers of things to be attended to, I felt very much alarmed, so much so that at last I determined to put as much of the responsibility of the acceptation as possible off my own shoulders by telling Graham plainly that I was afraid of undertaking it, after seeing in what the work consisted, and the extent of the arrangements I should have to make for setting up an assay office in Australia. He only laughed, and I did not know how to make any further objection. Accordingly I set to work to learn the assaying, and, after a little, joining in the regular business of the laboratory.

"At this time I lived in solitary lodgings at Camden Town (No. 13 Albert Street), and though rather troubled with business, I remember the time without displeasure. Occupied during the day at college, or about town buying apparatus, I spent the evenings very agreeably in reading. Geology was the subject I chiefly attended to, and De la

Beche's work on *Geology, Observation, and Comparison with Changes now going on*, the work I chiefly read."

At the beginning of February 1854 Stanley went to Paris for about two months to study assaying at the French mint. It was the first time that he had been out of England, and the journey to Paris was full of interest to one so keenly observant as he was. He stayed at a *pension*, 59 Rue de Lille, and went every day to the mint, where he practised silver as well as gold assaying. In a letter to his father, written towards the close of his stay, he said that he had learned much. His leisure time he devoted to seeing as much as he could of Paris and the environs, especially Versailles, of which he wrote home a long account. After satisfactorily passing an examination at the mint he returned to England, and made a brief stay in London to finish the necessary purchases of apparatus which he had to take out with him to Australia. He then went to Liverpool, remaining at home until he sailed.

His journal has plainly shown with what happiness he had looked forward to living at home again, and there is little need to say how much it had cost him to accept an appointment in Australia; but though it was chiefly done in deference to his father's wish, he never regretted it in after life, and he acknowledged at the time the force of the reasons which made the appointment too good a one to be refused. It not only relieved his father of any further expense on his account, but put him in a position to help his family, if necessary, in the future. Though he was not yet nineteen, his father could let him go so far away with the fullest confidence that he would do well, for, as Mr. Jevons said about this time, Stanley was "a son who had never given his father one hour's anxiety." He was so quiet and reserved in the expression of his feelings that he said but little of the sorrow he felt in leaving home; but it was none the less apparent to his family. He shrank from the leave-taking, the pain of which was prolonged by the departure of the ship *Oliver Lang* being delayed day after day. He was glad at last to go on board, and on the 29th June 1854 he set sail for Sydney.

CHAPTER III.

1854–1859.

The Ship "OLIVER LANG,"
11*th September* 1854.

"DEAREST FATHER—As we are now in pretty nearly the last week of the voyage to Melbourne, it is high time to be beginning some sort of an account of it, to let you know how pleasantly it has been passed by myself, or how unpleasantly by others. . . . In the Tropics it was certainly often extremely hot, but we felt it less than I expected, and the delightfully cool evenings made up for the days. For two or three days near the Tropics we had rather curiously in the middle of a dead calm a very large but low swell, which shook the ship about in a most uneasy and uncomfortable manner—it must have been caused by a storm just before. I can remember perfectly some of the splendidly fine days we had in the Tropics when we were lying on the deck under the awning all day, reading, playing draughts, or cards, etc., after tea, watching the sun set and the moon rise, and then sitting out in the night till late. Sometimes the sun went down quite alone without a cloud all over the sky. More often there were clouds of all variety of shapes. One time the sky all round was covered with bright fiery-coloured clouds, which, being of a scattered shape, looked exactly like ridges of flames; another time there were splendid mountainous masses of cloud about the sun, with others of different shapes and colours about the sky. Besides the clouds, there were the tints of the sky, which were very beautiful, chiefly singular greens, every variety of reds and oranges, and, after the sun set, a very beautiful rose or pink tint. Not to tire

you as we were tired with too much fine weather, I must come to the gales. We saw a little of the sort on the 22d of August, but on the 24th at 10 P.M. began the strongest. Though the captain had fully expected it, he had, according to his usual custom, kept all sail out. One topsail was reefed by the men very slowly, but they as good as refused to reef the two others, though ready hauled up, and accordingly they were both soon torn; three of the stay sails had been split at the first, and the three jibs were torn completely to shreds. These, with one royal, made nine sails more or less injured. The next day a different gale came on at 10 A.M., and we ran all day before the wind with only the mainsail and foresail set, looking more like a wreck than anything. A very heavy sea, of course, rose, and the large waves rolling in astern, and leaving by the head, looked very grand, and more like rather distant mountains and valleys than anything else.

"On 4th September and the night before we had another tremendous gale, during which five or six more of the principal sails were more or less torn, including the mainsail and foresail. About this time, too, we had plenty of hail and snow, and water often froze on the deck.

"Since then we have only had one other gale worth mentioning, on the 9th, but the captain had taken in sail before it began, and we ran quite safely and without injury through it with close-reefed topsails. Studding sail booms have been carried away without number from time to time, and two of them by dipping into the waves and snapping off with the force of the ship's motion. I always said that the ship could not be rigged well in such a short time as it was, and it is quite proved now by many things which are defective. Most of the iron-work is of the most horrible iron, and this is the chief cause of the loss of so many sails, as well as of the falling of two of the topsail yards, though luckily not down to the deck.

"We have, of course, had the usual succession of fishes and birds to amuse us. We wondered for a long time at the porpoises, until at last some dolphins were seen, a small one of which was caught by a line. In the Tropics we saw thousands of the small white flying fish, sometimes chased by porpoises, and at length a shark appeared with his two

pilot fish. He swam round the vessel for some time, but was caught, with some difficulty. Several others were caught from time to time, but the best sport was with the last one—he appeared in the middle of some Cape pigeons he was trying to catch, but soon came up to the ship. The hook with a large piece of pork was put over the stern, and we saw him slowly turn over twice and take it in his mouth. He was not, however, hooked till the third bite, when he was hauled straight up and dragged away to be cut up. He was about five or six feet long, and had a pigeon in his stomach, swallowed whole.

"We have had Cape pigeons following the ship now for nearly a month. They are very pretty black and white birds, of the shape of a pigeon, and fly about the stern in great numbers. Among them are nearly always several albatrosses. We have seen none of these of a white all over, and most are of a dull black, but they are magnificent birds, floating about in the air with the greatest ease, and without even moving their wings, which I have scarcely ever seen them flap. I have had very poor luck with my lines. We had some very pleasant meetings with ships till the bad weather began, since which we have not seen one. On the 23d of July the *Fletcher*, from London to New Zealand, came up to us, and ran a race for several days, falling back at last. There were often two or three in view at the same time, but there was no chance of sending a letter back.

"To come now to the first cabin passengers, it is no easy matter to know how to tell you about the continual quarrels. They have affected me very little, as I have been on friendly terms with almost everybody, but even considering that we are all Australian emigrants, and that most are only second cabin passengers turned into the first cabin, I could scarcely have conceived that so much jealousy and hatred, as well as petty quarrelling, could have been crammed into such a small place as this cabin during three months. . . . . I kept clear of everything, till finding that Mr. Lane was not the one in fault, and that he was a gentleman well worth knowing, I became more intimate with him. Mr. Lane is from Cork, but has lived twenty years in different parts of France, so as to have taken completely the appear-

ance of a Frenchman. He has been lately professor of literature (English, I suppose) in the College of Amiens. He is therefore a very well educated man, and knows a great many of the first men of France. I have had a great many very pleasant talks with him, but he has rather extraordinary political opinions, being a regular republican, engaged a little in the revolutions at Paris, as well as the Irish Rebellion. He is going to Sydney to see his father, and I shall therefore probably see something more of him. Mr. Newton is the one I care most for after him. He is a working engineer, at one time an engine-driver, but a very superior man. He has been engaged making the mint machinery, and is sent out to see it put up. After that he will remain there on his own account, but will probably be employed by the mint. As he is such a sensible, pleasant man, I shall try to get him to let me lodgings in the house he is going to take for his wife and family, and I should then, I expect, be comfortable enough. I should even, if possible, like to have my laboratory in the same house, but I cannot tell how it can be settled till it comes to the fact.

"About John Anderson, my chum, I need only say that he is as good a fellow in every way as I could wish to know, but he is going to a farm near Sydney, and I shall not see very much of him. Mr. Day, a retired old grocer and butter dealer from Shoreditch, London, is one of the kindest old men I ever knew. He has told me so many tales about all he has seen and done in London that I think I could write his Life. He is a great cribbage player, and I have had some very pleasant games to help over the long evenings, reading being impossible. Mr. Day is going to Melbourne, as well as Mr. Grylls, a young solicitor, and a sporting gentleman. Mr. Clarence (*alias* Joseph) Holt is a very amusing sort of man, but not from his acting, which is all tragedy. He is in a state of the greatest fear during the gales, standing in one corner of the cabin and asking everybody who passes what they think of the danger. The second cabin passengers are, on the whole, a very disagreeable set, though Charles Bolton's [1] chums are amongst the best of

[1] The young man whom he took out as an assistant. He was a younger brother of Stanley's nurse, who remained a valued servant and friend to the family.

them. The third cabin and intermediate passengers, on the contrary, are the best behaved in the ship. I have read very little, a thing nearly impossible on a ship, but have spent the time chiefly in watching the weather and such things, talking, and playing draughts and cards. In the fine weather, especially in the Tropics, this was all very pleasant, but since the stormy weather and long nights began it has got more tiresome. Twenty-four hours of some of the gales we had is enough to tire anybody out, from the motion of the vessel, noise, and wet; and I can give you no idea of what scenes there sometimes were at dinner, when, with a sudden lurch, hams, fowls, loaves, and cheeses, would roll off the table; water, soup, gravy, etc., would spill over you; and the knives and forks would fly into the corners of the cabin.

Off PORT PHILLIP HEADS,
22d September 1854.

"At last we are in sight of land, and lying several miles outside the harbour, with the pilot on board, and all anxious to get in, but without a breath of wind to take us in. We were expecting land all yesterday, and at seven o'clock in the evening the revolving light on Cape Otway was seen right ahead of us. The first land or mark of any sort that we had seen since we lost sight of Cape Clear. We hove to ten or fifteen miles from it, in order not to reach the Heads too early in the morning, and you may imagine what a pleasure it was to feel yourself near land, the Heads being then just in sight. The pilot came on board at eight o'clock, but the breeze had gone down entirely, and we therefore did not attempt to enter. At six o'clock P.M. a light breeze sprang up, which brought us just within the harbour, where we are anchored close to two lighthouses on Shortlands Bluff. The air now has a very distinct and pleasant smell of the land, and the water is of a dull green instead of its usual deep blue. We shall start to-morrow morning for Melbourne, which is still forty miles off. The coast on the western side of the entrance is very like that near Liverpool in appearance, with a small hill exactly like Dinas Dinlle, near Carnarvon; on the other side it is more uneven and rocky, with a range of hills in the distance. With the

telescope I can see very plainly the scrubby dark-coloured trees and the dull green hills just above the beach. The day is very fine and warm, and I should like nothing better than a walk among the rocks and trees. There are splendid pieces of branched red sea-weed floating on the water, which show me what to expect. Since I wrote last we have had some more stormy weather, particularly a very heavy gale on the night of the 14th, and a very sudden and violent squall on the 18th. One day a shoal of large grampuses passed us, which looked very singular with their great round snouts slowly rolling out of the sides of the waves. On the 14th and 16th we had fine displays of the aurora australis, which were much finer than anything I have seen of the sort in England.

MELBOURNE,
Sunday, 24th September 1854.

"Here we are, anchored a mile or two from Melbourne, and near enough to the shore for us to examine by the telescope the manner of life in Australia. The appearance of the houses in Richmond and Williamstown, which we see, is very strange and ugly, and tents are very common. The land round Melbourne is flat and not very inviting, but there are ranges of hills all round in the distance very similar in appearance to the Carnarvonshire mountains. I shall very probably go on shore to-morrow, and I have rather luckily made out Caldwell, Train, and Company's name on a large building at the water's edge. . . ."

On the 6th of October 1854, after a voyage of a hundred days, the ship *Oliver Lang* anchored off Sydney; and on the 16th of October Stanley wrote to his sister Lucy: "The passage from Melbourne was a very long and tedious one for the distance, and we were for five or six days continually expecting to be at Port Jackson the next day. At last we got up one morning with the port in sight, and I was quite disappointed to see nothing but bare perpendicular rocks and barren hills. I could not understand all I had heard about the beauty of Port Jackson till we got quite into it. Then I thought it really the most beautiful place I had ever seen. You must imagine an ornamental lake something like the Prince's Park, one of a very large

size, with a continual succession of bays, creeks, points, and islands. The banks are everywhere old rocks overgrown with bushes and trees—with very neat gentlemen's houses here and there—and when you get to the shore, the rocks under water are covered with sea-weeds and oysters and other shells. Altogether it is the most beautiful bit of scenery I ever saw, the different views of bays and points being endless in number. When I got into the town I was glad to find it looked such a pleasant old place, most of the streets being something like those of an old English town, though the verandahs round many of the houses give it a curious appearance. In the day-time I have not been able to sit still for a whole hour together, I am sure, but have been perpetually walking about town or else in the Domain. The latter is a sort of natural park—the best part lying along the side of Woolloomoolloo (can you spell it?) Bay. It is very beautiful, with its rocks and gum-trees, the shore being rather like that at the Dingle [near Liverpool], the water, however, washing up to the rocks, and with no tide worth speaking of. A part of the Domain is separated off as a botanic garden. There is no conservatory there, for bamboos, India-rubber trees, prickly pears, and other tropical plants grow in the open air, and geraniums, roses, and all the regular garden plants are flowering splendidly in the spring. Fruit is another good thing here. The native oranges and lemons are very fine, and good ones at about the same prices as in England, so that we eat a great number, while the fruit loquats are very cheap. These are a sort of small apple with immensely large pips filling half the inside, but they eat more like a half-ripe cherry than anything else. We shall have peaches and grapes very soon. I have been two or three times a short distance into the bush, but shall soon go rather farther. In most places it is literally nothing but bush right up to the shores near Sydney; and if you walk a few yards into it you see a most extraordinary variety of flowers and flowering shrubs. I was quite astonished the first time Mr. Newton and I went a walk; almost every flower we met was a very pretty one, but quite different from the last, till we picked, I should think, thirty or forty different flowers in the course of half

an hour. You may imagine what a collection I shall have."

On the 16th October he also wrote to his father: "It was fortunate that before I left England I had never expected the mint to be ready till about Easter, for otherwise I should certainly have been disappointed to hear that the building had hardly been begun (only six weeks since), that rents were enormously high, and that there was very little other assaying to do."

By the terms of the appointment of the two assayers to the mint, they were to have their own assay offices, and might undertake assays for banks or for private persons as well as for the mint. The first object therefore with Stanley was to find a place in which he could set up his apparatus. After a considerable search, in which he was aided by his friend Mr. Miller, the other assayer to the mint, he found a two-roomed cottage, 8 Church Hill, which he engaged at the rent of £2 a week. He describes it to his father as standing in a yard behind a warehouse, but close to the best part of the town. He then continues: "As to the cottage, I think we could hardly have made a better assay office with all the planning and considering we had together. The laboratory room, which has been a kitchen, has no ceiling, but is open to the roof as well as along over the ceiling of the other room. This will make it cool and airy, but the ceiling of the small room, being floored above, makes a store-room for everything I shall have to put in it. I think I can manage to put up the cupel and melting furnaces without disturbing the chimney and fireplace much, and the other fittings-up and furniture will not be so expensive as you would imagine. As to domestic arrangements, I am going to buy a small sofa-bed to sleep in, in my private room, while Charles will sleep somewhere about the laboratory or loft. We shall probably cook for ourselves entirely, and I have calculated that we shall live so cheaply in this way that the whole expenses and rent will not be so much as continuing in lodgings. You will probably say that we shall be uncomfortable living by ourselves in this way, but it must be done, as I have not money otherwise, and it is not thought at all an extraordinary thing here.

"There are some disadvantages about this cottage certainly; it is an old tumble-down place with lots of cobwebs and rats, and Mr. Korff has the lease for about a year more only, so that I may then be turned out, though, as he says, he will most likely have it again, and let it to me again. I shall therefore make the least possible alteration or improvements, and there would be less trouble in moving than perhaps you would imagine."

On November 12th he writes again to his father: "The fittings I have done in the laboratory since I wrote are (besides the cupel furnace, which is put up in the corner) building the melting furnace, making the laboratory table, the work-bench and some other things, setting the balance in order, and getting the gasfittings done. I daresay you will wonder that I have done so little, and I am myself astonished that work should take so long and be so tiring. The melting furnace I built with Mr. Miller's help, and though at first our brickwork looked rather crooked and loose, it has turned out much better than I expected. The draught is excellent, and will be better when everything is finished, and the furnace is very convenient to work at. It is bound together with sheet-iron corners and iron hoops; next it I have put up again the old oven, which may be useful. The greater part of the chimney is stopped up with sheet-iron. The gasmen have been at work now for two or three days, and everything is done but joining on the service pipe to the fittings inside, which will be done to-morrow morning. . . . . By the end of this next week I hope to be really in working order, which it is high time that I was."

In his journal he writes on the 5th of January 1855: "Time gets on fast, and I begin to feel the necessity of doing something satisfactory, and of carrying out to some small extent all the fine things I have imagined. In the last eighteen months what serious advance have I made in knowledge? I made some progress in geology, of which I was before that time quite ignorant, and I am gradually getting some ideas in meteorology, and such half sciences, but that good solid foundation of all other scientific knowledge—mathematics—I have attempted as yet in vain, and I am afraid that I have lost the habit of studying, and cannot

concentrate and direct my thoughts as I used. Still, I think this is no wonder, considering the worry, anxiety, and labour after common things and arrangements that I have had to go through. These may have been useful to me, but any advantage I may have derived from such changes and troubles must be set down under a different head, for they have not helped me on with study. For many months yet, too, I cannot look forward to be settled and to have my mind free for the subjects I wish. Of one thing, however, I am glad, I begin to feel that liking for, and interest in, history, poetry, and literature in general, which I always expected would come to me some day. It is certainly a much less severe exercise of the mind than the mathematical sciences, and I hope I shall not get to indulge too freely in it.

"It seems rather strange to say so now, but I cannot see that coming on such an errand as this to Australia will at all benefit me ultimately. It is a perfectly decided thing in my mind to be at home again in from five to ten years, and as I have no intention of being nothing better than an assayer or chemist all my life, I shall have to begin life on a new bottom. Only I shall begin this second time under considerable advantages, backed by a small capital (supposing everything to go on well here), my mind well formed and its direction clearly determined, with a good many years *colonial experience* of the world, which will be equal to double as much *home experience*, and I hope with knowledge and abilities which will enable me to get a good stand wherever the standing-place may be."

He continued to live at Church Hill until the end of April 1855, when he moved to the house of his friends, Mr. and Mrs. Miller, at Petersham, a suburb of Sydney, and during the rest of his stay in Australia he made his home with them first at Petersham and then at Double Bay, where Mr. Miller built a house. Of the latter place Stanley had always a very pleasant remembrance, and spoke of it as the most delightful situation in which he had ever lived. He describes it in one of his letters.

When the mint got into working order it was arranged that the assayers should have their offices in the building, and should receive a fixed salary, giving up all assays for

the public. They were also repaid for the expensive apparatus which it had been necessary to purchase, and as Mr. Thomas Jevons had advanced the money to his son for the apparatus, and for the outfit, his son repaid him as soon as he could.

This arrangement with the mint was much preferred by Stanley, as it gave him fixed hours of work, and left the rest of his time at his own disposal. At Mr. Miller's house he passed the evenings in his own little study, occupying himself with meteorology, reading, or music, except when the mail was leaving for England, when his leisure hours were spent in writing long letters home full of interesting descriptions of his new life.

To his sister Lucy.

ANNANGROVE COTTAGE, SYDNEY,
28th May 1855.

" . . . I am now at my new, and I hope final, lodgings here, and I have been here three weeks already. I have been living, of course, in a more comfortable and civilised way, but the chief comfort is, that I now have regular and moderately hard work every day in town, after disposing of which, I come out here to spend the evening quietly either in my own room or the parlour (for we have regained the long-lost distinctions of parlour, drawing-room, sitting, bedroom, kitchen, etc.) My little room will be much more comfortable when I have got a few more things for furniture. If I get the first payment of my salary towards the end of this week I shall probably buy a bookcase with glass doors to keep my books and other things clean and out of the way. Possibly I may even spend £30 in getting an harmonium, as I wish very much to have a little music; but this may seem very extravagant. My life is now as active as it was idle a little time since. I get up about eight, off to town at nine, getting to the office by ten o'clock. The assays there, if an easy *batch,* are finished by four or five o'clock, and I start off back for dinner. The distance to my office is quite four miles, and I walk on an average six miles out of the eight; still, though quite fresh to it, I do not find it too much, and am often ready in the evenings to cut firewood, etc. In

fact, I am in most excellent health, and this place is a deal better than Sidney for health. The road is one continuous line from here to Church Hill—viz., along the Parramatta Road, Parramatta Street, and George Street, and a more disagreeable road it is impossible to conceive—dusty or muddy, straight, and going through the hills by cuttings. It is crowded in the daytime with herds of cattle and sheep, bullock teams, drags going up the country, mail coaches, omnibuses, diggers on horseback, etc.; in fact, it is something like what the roads must have been in England before the time of the railways."

To his sister Henrietta.

ANNANGROVE COTTAGE, SYDNEY.
1*st July* 1855.

"I will now tell you a little about the house I am living in here. It is a low neatly-built Australian-shaped house; the little dining-room is comfortable, and looks on to the road; the drawing-room is a fine room of three windows, comfortably and handsomely furnished, and which would be admired as a good room anywhere. My little room is awkwardly shaped and placed, but being now furnished according to my own ideas of comfort, convenience, and elegance, I am thoroughly satisfied with it. At one end is the harmonium, always open and ready for an occasional tune; the bookcase is a really handsome one, with glass doors, standing on a chiffonier containing a large drawer and fine cupboard to hold large books, and other things.

"It is easier to plan than to perform things, but, of course, when the work of the mint becomes easy and regular I shall begin to think of long walks, collecting Australian plants, etc. Returning to home matters, however pleasant life here may become, one does not look upon it for one moment but as temporary. Everybody talks of home, even, it is said, those who have been *born here;* but whatever other people do, home, you may depend upon it, *I* shall come in due time. These thoughts occur to me now more especially because last Wednesday or Thursday was the first anniversary of the day on which I left home. If other years pass as quickly as this seems to have done, and they

will no doubt pass quicker, the time will not seem so far distant.

" . . . By the by, very fortunately, the day before yesterday I found a delightful way to the town through woods and dales instead of along a dusty road. I start off in the wood at our back door, and walk through close tall gum-trees and over picturesque rocks for a full mile, when I come to a stream, an inlet of the harbour; this is crossed by a bridge formed of a large gum-tree which has been blown down and fallen across it, a long row of bullocks' *skulls* being laid in the mud as stepping-stones on one side: the view here along the stream is also quite pretty, at least to Australian eyes. Then another mile through bush land and trees brings me within a few hundred yards of the omnibus stand at the end of the town."

To his Father.

ANNANGROVE COTTAGE, SYDNEY.
16*th July* 1855.

" . . . The first good news as to money matters is Captain Ward's proposal of a fixed salary. To know that I have really accepted and received the salary of £675 would, of course, remove all your anxiety about my money affairs, for I have been getting very low in pocket. I have now, however, the pleasure of repaying instead of borrowing money, and am sending £180, which is as much of the £200 granted for back salary as I can well spare now. Before the end of the year I shall no doubt be able to send some more, particularly if we receive soon the £200 owing us for apparatus. I must say the money has given me very little satisfaction, except that of sending it home. Whether in the bank or in your pocket I find £100 like a very disagreeable weight upon the mind, so I shall be very glad when it is off my hands, though I hope safe in yours. I don't know whether I shall feel the same with respect to money always, but if so it is rather depressing. . . .

" We are not altogether without amusements here, and I have been several times lately to the theatre to see Brooke act. I like a play now as well as anybody, but it involves a long solitary walk at night, which suggests revolvers and convict highwaymen.

"I am telling you now, however, very little of the assaying. Even now, when so little gold is coming in, we are very hard worked; and if we had any large quantity of coinage we should require additional assistants. It is the common remark at the mint that the assayers are the hardest worked of any. We have also not been altogether free from anxiety about these sovereigns, but I have no doubt they will be all right. They are now getting quite commonly into circulation."

He writes in his journal, 4th November 1855: "For pretty nearly as long as I can remember I have been accustomed, as a habit, I believe, to the pursuit of some particular subject, and when I think about it, it occurs to me that I have had a regular succession of subjects, each of which has had my voluntary attention for a year or two at a time. Botany is about the first subject I think of; and to this I very distinctly recollect my mother, of loved memory, trying to direct my liking. In fact, at home are all the books, each of which I can remember her giving me, and of the little microscope particularly I can remember every circumstance. Botany was for a long time, in fact till within a few years since, my only voluntary study. From want of any other help than books I got on very slowly, and I never had more than the slightest knowledge of it, though a practical one. Still I liked it exceedingly, and no doubt the time was not lost time.

"Up to the time of my going to London what a little I knew of any science but botany; I had tried to read a book or two on parts of natural philosophy (*Library of Useful Knowledge*), but I knew not one fact of chemistry except the recollection of one or two of Roscoe's experiments which I treasured up in my mind.

"At University College School I took to chemistry, and went on fiercer and fiercer at it till I got the gold medal at college: the part of chemistry I liked best was molecular philosophy, and this I followed out a little, though, from its branching out into nearly all the other sciences, it was a serious affair. One, crystallography, in particular I liked.

"While learning assaying in London, another science rose to the top, *i.e.* geology, and I followed it through a few

books and two or three excursions near London and Paris. Finally I have come to, and am pretty hard on, meteorology. Buff's *Physics of the Earth*, recommended to us by Graham, was the first book I read on it, and my first thermometer observation was made in the half year before sailing for Australia.

"I had a thermometer with me, and intended taking the temperature of the air on the voyage several times a day. However, I broke it in taking the temperature of the sea a few days out, and then I was obliged to content myself with what I could write down of the weather. A very short meteorological journal I carried on throughout the voyage, but I was ignorant of the proper meanings and distinctions of the common names of the clouds, and had no means of any exact description. Nevertheless I saw enough to interest me very much in the clouds and several parts of meteorology, and on landing I determined as soon as possible to begin a proper series of observations.

"In the middle of January, about three months after my arrival, I began, buying a maximum and minimum thermometer. In such a place as Church Hill I was awfully puzzled to know where to place it; at last I put it in a thick flat wooden box fixed against the wall of my cottage, and surrounded on all sides by walls. There, if anywhere, it was first-rately protected from the sun's direct influence, but what fraction of the daily range it showed I cannot say. I made my own barometer, and used it for some months, not caring much for the bubble of air at the top. Two observations a day I took from the first, at 9 A.M. and P.M."

To his brother Herbert.

PETERSHAM, NEAR SYDNEY, N.S.W.,
29th November 1855.

"The mint goes on swimmingly now, 20,000 oz. being an ordinary week's receipt. Nevertheless I cannot say we are overworked, for we get to do the assays very quickly, and often do not work longer than from ten to three. Still, when you add in everything that I have to do, it does not turn out to be a very easy life.

"On the whole, however, I may say that we are getting

on at Petersham better than ever we did before, and there is nothing like an active life to be pleasant.

"These few nights I am very busily engaged copying out a register of the weather kept on board the *Maid of Judah*, from London, by the captain. It was the ship Mr. Trickett came out in *two voyages* ago. I am copying the whole for Trickett, as well as parts for myself. The observations are every two hours, but were made in a rough sailor-like manner; still, they are worth having. At the same time we are having thunder-showers here, and the splendid thunder-clouds cause me a deal of trouble in observation and description, etc.

"A little time ago I was at a very jolly thing, viz. a moonlight concert in the Domain. It struck my fancy as the most enjoyable way of hearing music, from the place and manner being completely natural. The Domain is a sort of natural park, and you walk about it or lie on the grass in the moonlight just as you like."

To his Father.

PETERSHAM, N.S.W.,
18th January 1856.

"I know that at any time you will be glad to have a letter from me, and so, without any particular prospect of a mail, I am going to write you a few pages. I have been much occupied the last twenty-four hours with an incident that occurred to me last night, and which I shall not easily forget. On going upstairs to bed about 10.30 P.M., with a candle, I had got but a short distance into the room when I saw a long irregular black thing lying on the floor. I was puzzled at first to think what it was, but a very few moments of examination were required to decide the question, for it was without doubt a black snake, and still further to convince me, the thing began to move and to hiss! To tell the truth, I then went out of the room quite as fast as I came in (as people say), and, to have him in safe keeping, shut the door. On returning with Mr. O'Connell, provided with sticks, etc., for his destruction, we could see nothing of him, but ultimately discovered him hidden in a corner under the bed, from which being displaced, Mr. O'Connell soon killed him

with a few good knocks, but not before he had made a great display of his wide-opened mouth and forked tongue. The fellow was then found to be over a yard long, but though he be no wonder himself, everybody acknowledges it to be *the* most singular fact they remember of a snake getting into a house, for besides crossing the yard, he had to go up several stone steps into the lobby, and then up long, steep, and rather awkward stairs into the room. Everybody says, too, that he is a regularly poisonous rascal. It is well, however, that it was as it was, for if he had simply moved under the bed before I came in, I should have probably gone to bed with him under me—a very disagreeable thought. I have thus been giving you an account of the affair as lengthily as if I had been talking to you, and I do not know what for, unless for my own satisfaction and amusement, but I hope not to your alarm. It is singular that this is the first snake of any size that any of us have met this summer, and in all probability I may go to bed every day of my life and not meet a second.

" . . . Though often rather tired with assaying in the midst of hot winds and the present awfully close weather, I am very jolly and well. Last Monday I went a long walk through the bush and *swamps* to the shores of Botany Bay, but it is rather an uninteresting place, except for its associations, and I got back without anything worth relating. . . .

" *Sunday, 27th January.*—In many of your letters, some months since, you noticed my having been to a *déjeûner* at Dawes Battery last year, and seemed to take pleasure in it. The same thing came off yesterday again, being a general holiday for the anniversary of the foundation of the colony; but as Captain Ward, of course, knows ten times as many people as he did then, it was on a much more extensive scale. It was most excessively formal; but I found it easy to get on without being noticed for any peculiarity among the number of people, and I was somewhat pleased to have an opportunity of observing the Australian aristocracy. That you may understand the occasion of the whole affair, you must know that the Sydney people, liking holidays, make the anniversary day a good excuse for one, and the whole town turns out in a way unknown in England, unless it be a Good Friday or a Fast-Day. The chief attraction is the regatta, the principal

one of the year, and the points at Fort Macquarie and Dawes Battery are crowded with people, as well as all other places within sight. Captain Ward's house, on the top of the point, has the best view of the whole; and from the pictures you have of the harbour you can imagine what a really beautiful scene it is to see it covered with different yachts and sailing boats, innumerable row boats, many of the large coasting steamers strolling about with bands, and full of visitors, and all the shipping and flag-poles fully decorated with flags. Any one arriving from sea on a regatta day must indeed think Sydney a fine place."

This last letter, addressed to his father, was never received by him; he had died in the previous November, but so long did it then take for letters to reach Australia that it was the 14th February before his son received the news. Mr. Thomas Jevons was travelling in Italy with his eldest daughter and niece. An entry in his son's journal says: "At an hotel at Pisa, just at the commencement of his return journey, he was suddenly seized, on the night of the 7th November 1855, with an attack of cholera, and after severe suffering, soothed only by the presence of his most dearly-loved daughter Lucy, he died on the morning of the 8th."

A few days after the news reached him, Stanley re-read all his father's letters to him, numbering them, and entering in his journal the contents of each letter, and any remarks which the chief passages called forth. Referring to the letter dated 18th April 1855 he writes: "Next he refers with evident pleasure to the improving condition of their iron business, and also to his plans, which have since acquired such a melancholy interest, of extending their business to the Continent. It is evident, in fact, that he had already made up his mind for a continental journey, which he had long looked forward to as a crowning pleasure of his life. In reading it, however much I might wish that he were still living, I feel not even the slightest possible tinge of regret at the plan. After many years of anxiety, trouble, and sorrow, he found his affairs continually growing more and more cheerful in aspect, and he died at a moment when everything was prosperous and satisfactory, and himself in the midst of the truest enjoyments."

To his sister Lucy.

14th February 1856.

"A sad day indeed has this been to me, for the mail, *per Mermaid*, this morning brought me numerous letters, in which the one intelligence was the death of a father such as ours was, far away from our common home, and that home still farther off from me. Your letter (of 12th November), I may truly say, has been a very great comfort to me, written with so much feeling and love, which I know could never be away from you; but also in so collected and thoughtful a manner, as could hardly be expected after such a sudden and heavy loss, and in such desolate circumstances. I thank you for it, particularly for portions of it assuring me that my conduct and progress (such as it is) were to the last a great satisfaction, nay, a great pleasure, to him. This forms my chief consolation now, and will through life leave a bright mark of joy upon his memory. This great loss must of course alter for all of us very much our motives, duties, and plans. For myself I feel as if I had very suddenly and almost unexpectedly lost an object which for a long time has been more and more a motive urging me to exertion, namely, to please him whom God has just taken from us, and thus partially to repay the affection which he has always shown to all of us in such perfection and constancy; the same must be the case with each of us, particularly with you whose part it has been so long to care and manage for him, and whom he speaks of in one of his letters to me as acting as his 'right hand.' But you will stop me instantly and say that, though he is no longer bodily present with us, we must act on, in such a way as would give him pleasure still; and, besides this, that we still remain bound by the affections of brothers and sisters. Nevertheless, one feels that the loss of our last parent is like the removal of a rest upon which we stood, and that now one enters the problem of life in a wider, freer, but perhaps less cheerful sense. Such at least it is with me; but a little thought and habit will no doubt bring things back to a more regular and proper course. . . . You have mentioned his pleasure in reading my last letters received in Rome. I wonder what those letters were? I

am afraid my letters there were not so long and good as I have since tried to make them; and it is sorrowful to think that my letters will still keep arriving at Chatham Street for six months, and he no longer there to read them. You mention some small gold coins which he was keeping for me; they will be kept as carefully as a small present I received in a similar way through Uncle Dick from my mother. As to any other things, I had better leave it altogether in your hands. The drawings of parts of Pisa will be a very thoughtful present of yours.

"As to the journey, it really seems as if the pain were diminished by knowing that his life was terminated in the midst of such really deep pleasure, almost happiness, which I can well believe he took in great and interesting sights, and as his letters and descriptions plainly show. From all accounts, and my own knowledge, this journey has for some time been a favourite design and object of his life; and as all pleasure and good is to be got only by exertion, and as exertion must be accompanied by risk, thus alone has arisen the occasion of his death. Also, if I understand rightly his object in combining business with travelling, the present state of affairs with America is near upon the point of proving his foresight. He seems to have been excellently attended in his short illness, and you were fortunate in finding such a kind man as Dr. Lambe. . . . As for myself, I take it and bear it, I hope, as I ought. Beyond half a day (Mr. Miller taking a box of assays off my hands) it will not interrupt my usual business, and the people at the mint will know or observe little more than the simple fact. But it will be long before the current of my thoughts in private can be turned from constantly dwelling on you and the others now forming my much-changed home. Thus have I given you with much more freedom than perhaps I should on any less occasion all my thoughts for the first few hours after getting the letters, and the time spent in writing this is in the dead and quiet of the night, which seems the pleasantest of the day; for never before did I feel more inclined to be and think alone, unless indeed I could be in Liverpool; and it is the first time I have been able to consider things calmly and

fully, and without the confusion of thoughts that one has at first."

"*Monday Evening*, 18*th February*.—Though my thoughts have been almost throughout the day ever upon you and the one sad subject, the work and other occupations of the day are now done and laid aside, and I sit down for a quiet *think* and a quiet write. It is my way of bearing such a loss without *anybody* near to sympathise with me. Last night was the most beautiful night conceivable, or that in fact I think I have ever seen. A cloudless sky, bright moonlight casting shadows among the trees, and air so warm and yet so pleasant that I sat out late at night, and felt no feeling of chill. But the beauty of the weather only reminded me the more of Italy, which this country is said to resemble most in climate, and the very hot wind we had to-day is like the sirocco. Thus I shall often be reminded while here, even by the weather, of the place and beauties amid which our father died; and you no doubt too will similarly feel anything reminding you of the scenes you saw when accompanying him there. I must say I think of these things with feelings scarcely to be called painful, so happy is it to be able to know that at the last his life was *full* of pleasure and satisfaction: when one thinks of it thus one could hardly wish it otherwise, for the very taking of such a long journey shows conclusively that his mind was quite at ease as to money matters, and free from other anxieties, except that indeed of getting back safe for his children's sake; and as to this he was saved from pain by the shortness of his illness. Under this view, you can, no more than I am sure that I should, feel regret about this journey, or look back upon it with anything like pain.

"Dearest Lucy, you tell me 'never to forget that home will not have passed away because the head has gone.' These words I shall remember, for they are intended to remind me that your love and the others, as well as affections, perhaps, that we shall now more than ever feel the value of, remain. Yes, home will always remain, and in conception will have the same good, indeed heavenly, influence over us in all places; but how can we hope always to 'think of it as of old?' for we must all feel that Providence often separates those who love each other best, and that a family

must often be broken up for its mutual advantage. I set not my hopes, then, in living again in a settled home, for we do not know how our lots may next be cast. In this *I* particularly, have been well instructed, for, for three years I lived the greater part away, and then when I would not willingly have gone again, the offer of this affair made it evident that on all accounts I must, and so I left for longer than ever, but is it not sure that *he* felt much more sorrow in sending me than I perhaps in going? In all probability then, we must be contented with two things: 1st, we must treasure up the remembrances of home as it was long ago 'of old,' and this I am sure will remain with me, more than with most men, the happiest recollection of my life; 2d, we must still keep up a sort of ideal *home* formed of the mutual affections of brothers and sisters, though distantly separated, and surrounded by the kindness of other relations and friends, and this *home* must take the place for the younger ones, who most require it, of that more actual and complete one that they have lost. Even as to this, who can deny that it will even have a sort of completeness in feeling, for how can we ever think of each other and not of our father as well as our mother who died while yet *I* as well as the little ones stood in need of her love and care, which was supplied in feeling much in the way I speak of; and, as we know, chiefly through yourself?

"Dearest Lucy, when I think of these things I begin to feel as if I had a right to lament his death more than any of you, for I have been away more, and was away during the last year. Hence I almost think I must be actually less acquainted with him than I should otherwise have been, and it is after such a loss that we best learn the value of that loss. But you would never think or believe at any time that because I less knew and saw him, and was far away on my own affairs towards his end, I any the less knew his value, feel his loss, and now feel sorrow at his death."

To his sister Henrietta.

15th February 1856.

"One of the things I said in my letters, and which was repeated again from home, was a sort of wish that *home*

should remain the same as it was when I left it, so that my idea of it then should remain continually true, but how far otherwise has it turned out in less than a year and a half. True it was not positive hope, for every one is aware of the uncertainty of life, if he have it not continually before his eyes; and as to papa, we know that he had already lived many years, for which we have so much reason to be thankful. Therefore I was not unprepared for letters such as yours and the others, and I cannot doubt that in parting from me he strongly felt the possibility, almost probability, that he should never see me more on earth. That parting day, when I think of it, brings tears into my eyes more quickly than any other circumstance; not now alone, but each time that it has come into my mind since I left, I have felt the manner of that parting to be most touching. A whole afternoon, my last one I believe in England, he stayed at home *with me*, and *near me*, disregarding his usual business, and most unmistakably showing the great difficulty he felt in allowing me to go so far away and for such a time. And when beforehand one is sure of a father's love, is it not the highest proof and trial of its nature that it can thus allow its object to remove and stay at such a distance, and with such a possibility at his age of never being together again? That parting will always form my last personal recollection of his love and goodness, and you can imagine that a book which he gave me that day, his own library copy of my grandfather Roscoe's life, and which he must have set the greatest value on, will have with me now an accumulated value, and shall always remain my own, though before I felt as if it properly belonged to the house and not to me alone.

"Dearest Henny, for I am afraid I am writing in too distant a manner, and not enough filled with others' sorrow, I will address this letter more fondly to yourself. I am glad you are now just of an age to comprehend and distinguish, as well as instinctively to feel, papa's goodness, love, and worth; and though your sorrow may thus be all the deeper and more lasting, it will be full of meaning and understanding. In this way the death of a father may well be made to form one of the greatest and deepest lessons of our lives. The ordinary course of affairs (in which let us hope that

pleasure always predominates) is disturbed, the question of life seems forcibly laid open to us, and one then perceives, if ever, its inexplicable nature, its incompleteness. This course of thought it is which leads us most irresistibly to believe in a future life to come, for this life being unfinished, the object unattained, we cannot but look forward to a future existence in a more perfect state, certainly in an incomparably happier one."

To his brother Tom.

2*d May* 1856.

"I daresay you will hardly think how much I am interested in your proceedings in London. It is from the great wish I have that you should, in the best meaning of the word, be successful, and obtain all the possible good from the new course of life you are beginning. Being the youngest, you were the one of us about whom my father had the *fondest hopes;* and, now he is gone, all the rest of us look forward just the same to seeing those hopes fulfilled. Moreover, I feel a great interest in a younger brother going through exactly the same sort of life which I remember myself with so much pleasure, and you must therefore write me now and then a good long letter about everything you are doing at school, everything you see in London, and what you are intending to do.

"People, at all events many people, do not like to be beaten, *i.e.* surpassed, but this feeling may in some circumstances be overcome by better feelings. Therefore it is that I hope after you have been in London a year or two, that you will leave me nothing to speak of, as to prizes and the like; but whatever you do I do not doubt you will do it with the best of motives, *i.e.* to gain real good and worth, and not in the least for show or the *name of the thing*. Stick to the real solid desire of improving yourself, and in some way or other, more or less direct, rendering yourself useful, and then you need not care a straw about other persons' opinion of you. It is the most comfortable thing in the world to know yourself to be better than people think you, and it gives you the truest ease of mind; and this I have no doubt is worth all the pleasure one can have in being considered *a*

clever fellow, or *a very jolly fellow*, or even *a very good fellow*, which are the commonest ways in which a *fellow's* worth is measured and expressed in society. In short, do not look to others' approbation merely. . . . I did not think you would have taken so high a place as to classes. But do not think too much of the place you have got in the school. In this (as I believe in most other things), the *rate of rise* or improvement is far more to be considered than the *point actually attained*. I was rather surprised, and, I must own agreeably, to find you say 'All the masters mentioned Stanley, Mr. Key himself included,' and I shall take an interest in all you tell me about the old school. How do you like old Mr. Travers? I think he liked me better than any, and he was rather grieved at not giving me his first prize, but he gave me first mention, and a place equal with the first boy, instead. London is a fine place, and while you are in it make the best of it. You will do no harm in going to plenty of exhibitions, all sorts of sights and the like; and they are no loss of time or money, provided they do not interfere directly with your lessons. I remember I used to think the Queen opening Parliament, etc., the best fun possible, and used to try how often I could manage to see her.

"When you are a little older I think you will find it very well worth while to take walks through London just as you would through a pretty country. The portions of London are as distinct in appearance and character as the nations of Europe, and they are large enough to take long excursions among them. I will leave all *cautions* to Lucy, who is great at them.

"Living as you are with Aunt Richard, and among company, I am afraid you will grow too fond of parties and such-like, but my real honest opinion of them is that they are of very little good; and, though you have no occasion to be like me, you would hardly think how much time is lost by going out one night here and another there. Of home, where you will be, I suppose, when you get this, I cannot say much, as nothing was settled even at the latest dates I have heard news of. I daresay you, most of you, think me a lucky fellow, for a good sum of money goes a long way, but how

I should like to be among things again, something like the 'lags' (convicts) of Botany Bay in former days must have wished to be at their old practices. However, I amuse myself as I best can, and always with a view to my *term expiring*."

To his sister Henrietta.

SYDNEY, 3*d May* 1856.

". . . My opinions go in the same direction, but rather farther than yours. All the religions and religious opinions on the earth I regard only as so many different exteriors, one may say costumes, thrown over a few simple and eternal truths or principles which are more what would be commonly called 'moral truths.' The exterior religion has varied with different times and people, from the most barbarous (examples it is unnecessary to name), in which the inward meaning was often quite lost sight of or misrepresented, down to the most simple and truthlike, which I have no hesitation in saying is, among creeds, the Unitarian.

"I will venture even to say that a man who has a really serious mind, such as would reflect on the nature of the world, and on the way in which we are temporarily placed in it with the evident design of seeking the purest and greatest possible pleasure, is sure to gain certain principles or feelings, such as a trust in the course of things (*i.e.* Providence), a persuasion that we have all duties to perform to each other, without which *society* could not be endurable, and also something of the nature of *sympathy with the feelings of others*, out of which arises love, etc., and that these are the essence of all true religion. The man may even be said to be *religious* though he never heard of God by any name, and has never been used to put his feelings into the form of any creed or set opinions. God is but the embodiment of the first and greatest principle of the world —viz. *universal good, order* tending towards good, *design* —all coming under the comprehensive term Providence; and Christ I conceive to be an example of a Perfect Man, and of the relation which such a character must bear to God."

To his sister Lucy.

3d July 1856.

"How much would I give to be one of your party; how I should like to live in London again, and in my sister's company, how much pleasanter would it not be than here! I should feel sad, I believe, at being shut up here and far away if I did not feel sure that you thought of me as if I were still among you, and that you only looked upon me as fulfilling a part which chance or Providence, as you may choose, has marked out for me, which being completed, I may again be free to follow my inclinations.

"While in this serious strain I cannot help mentioning that few things said in a letter could have affected or truly pleased me more than the words you remember papa saying, that 'Stanley never gave him anything but happiness.' This is what I have long hoped and trusted was the case more or less, in fact his letters, which I have been lately reading, often express it; but to hear it thus distinctly stated is a fresh proof, and will always raise a delightful impression in connection with my remembrance of his character and love towards me."

In his diary he writes, 29th July 1856:—"My principle of action, indeed of life, is this, and it has been growing more and more defined for some time: I aim at qualifying myself for any object I desire in life, I aim not at it and try no means to obtain it but those of being fit for and worthy of it. Witness my almost total and partially intentional neglect of ties of acquaintanceship and interest and my habit of total reserve. It originated a deal, no doubt, in mere bashfulness, or a nervous want of confidence (which I really have no want of); but I now begin almost to esteem this property in myself, and should feel utterly wretched if I knew another to think me better than I was. Persons older and more *experienced* than myself might perhaps shake their heads and say it would never do; I, however, feel inclined to regard worth as synonymous with *success*, and though not independent of the *chance* and unavoidable and inexplicable *evil* of this world, still by far the best armour against it.

"Speaking of experience of life as we find it in old people,

is it indeed at all a desirable thing, and is it not the absence of it that makes youth daring, enterprising, and happy? Is not the old man speaking to and warning the youth something like a dull, worn-out, old carpenter's chisel with a rounded edge speaking to a new and fine one just sharpened, and in the Carpenter's (God's) hand about to enter on its tough and woody work, saying, 'Oh, it is of no use your beginning your work with such a fine edge as all that; I was just as sharp when I was as new as you, and you will be just as dull and useless as I am before you have been long at it?' It is perhaps true that a chisel dull all its days might be contented and happy, nay, even as happy as the sharp, and therefore always busy chisel, just as a quiet country life may be pleasanter than a busy public one; but when would God's work or the carpenter's either be done if men and chisels were always dull?"

To his sister Lucy.

Monday, 22d September 1856.

"A letter from you had been long looked for, and two or three mails in succession had arrived without a sign of one,—a disappointment which I now find is owing to the irregularity of the mail ships, since I to-day received the expected letter 113 days old. The pleasure of such kind, long, and interesting letters, too, from each of you, was almost more than I had hoped for; and after reading and considering them, I have felt that there is a deeper meaning in them, especially yours and the one of Henny's, than almost any letters I have had before. The reason soon suggests itself to me—viz., that while my father lived he was properly the subject of all our most serious thoughts, and the one in whom to confide them; now, however, that this centre is removed, we are all in all to each other; and our common love resumes a degree of immediate importance and interest which it did not need to have before, though perhaps it was equally strong. If you knew (as perhaps you may imagine) how entirely the letters I write home are the only way in which I express my feelings, being as I am completely among strangers, and without one I care to confide them to, you would understand the necessity I feel to answer such as

these, and the real encouragement they give me. If it is quite true that I have often, especially of late, felt a certain degree of real loneliness, I do not mean want of society, since that is what I never did or shall want, but the feeling of an accumulation of private and personal thoughts and objects which come at last to weigh too heavily. Perhaps I am not quite right in being so exclusive, and caring so little for other people's society: it began no doubt in a habit or infirmity of what is called bashfulness, and though that operates still, I do not think it is the whole cause and reason of my character in this respect. If I were, on the whole, like other people, I should no doubt resemble them in this also, and I cannot help feeling that the real difference there is between me and others in many respects, and which I can mention without any fear of egotism, is *partly* the reason of my caring little for the society of the generality of people. My life always was, and is now more especially, a laborious one, and I have always looked more to the future than to the enjoyment of the present; what that future, or the end itself may be, God only knows, but I am convinced that if only moderately good, it will fully justify me for somewhat in appearance disregarding most other people, and prove me not in the least *selfish*, as perhaps some might think me. I give you these thoughts simply because they are what are uppermost. While my father lived they did not arise so distinctly, and were chiefly absorbed in a plain feeling of duty to him. Now one's objects and views are more one's own, regulated only by general ideas of what is right, or modified by the remaining love and interest among ourselves. My father's death has with me, as with the rest of you, never taken the form of *regret;* it was no loss or unhappiness to him, for he died with as much pleasure, of the truest as well as of a more material kind, surrounding him as almost ever happens on this earth; it is with each of *us* that the loss occurs, felt on my part in a manner that I tried to express in my first letter. For yourself, dear Lucy, it must be a satisfaction for you to consider, both how plainly marked and unmistakable your *part* has been, and how completely and lovingly you have always performed it to its utmost extent, viz. that of attending and supporting

my father while he lived, and also of taking care of all the rest of us more or less, as I may say. Now more than ever it seems to me that you are necessary to us, not only in directly bringing up Henny and Tommy, but in keeping the whole of us together, in a manner that is sure to produce better feelings in each, and, as far as I am concerned, to prevent that feeling of loneliness and *objectlessness* of life that I have alluded to before, and which I so fear."

To his brother Herbert.

Monday, 22d September 1856.

"The mint goes on steadily, but without much work. Our sovereigns, you will probably know, have obtained a very good character in England; I see no possible objection, therefore, to their sending us out some proper *dies*, and making our coinage imperial, and therefore current in England and everywhere.

"Assaying goes on all right, and I am comfortable enough in my private office and laboratory. I am generally engaged more or less with attempted improvements or some little experiments, but it is no easy thing to introduce substantial and practicable improvements in a thing like the gold assay process, that so many have tried their hands at.

"Sydney was rather alarmed last week to hear of the capture of an immense shark in the harbour. I went to see it, and there is no mistake about the fact; it is twelve or thirteen feet long, and nine feet in circumference, and with an immense mouth about eighteen inches across, so you may imagine what a really alarming fact it must be for those who are fond of bathing about the harbour. It is said to have been long known to boatmen under the name of 'Big Ben,' and I have myself seen sharks' fins appearing above water in Darling Harbour.

"A short time since I went a walk on Sunday morning on a bush road past Cook's River, and was surprised to meet a large black snake, nearly five feet long, as deadly a sort as the devil. I had no idea of attacking it with a short walking-stick, and could not kill it with big stones before it escaped into some scrub. Unpleasant sort of acquaintances these sharks and snakes.

"I am kept pretty busily engaged at home now by my meteorological observations. I have lately commenced sending a weekly report to the *Empire*, and I send you two papers containing my reports. Mr. Parkes has given them a very good place in the paper, and printed them exceedingly well, but this confounded Government service prevents me either asking or receiving any money any other way, and I therefore do it more for fun. It takes about two hours a week to calculate and make it out, but this is little more than I should do for my own satisfaction. I am engaged now too in copying out, correcting, and calculating my two daily observations for the last twenty months, which I had allowed to accumulate; it is a work of some forty or fifty thousand figures, independent of continual calculations, *drawing of means*, and other work. I am beginning, however, to get some results out to repay me."

To his sister Henrietta.

1st October 1856.

". . . I have felt indeed for some weeks some degree of a slight melancholy, of which I do not know the cause. I do not think it arises from anything disagreeable, for I never got on better with work of all sorts than I think I have lately, but it seems to be a tendency to take everything in a serious point of view. If there is any other cause, it is the thought that I have only been two years in the colony, and that three similar ones must probably be passed before I could follow with satisfaction to myself or others my strongest desires. Everything I do or think has reference to my being again in England sooner or later, and for better or worse, and this not only in order to see and be with you and the rest again, but because I think it is the only place where I could be what I should wish. You did not overestimate the chances of a man in my position marrying and staying here. An income of £700, a light and not uninteresting business, a pretty country and cheerful town, a few not unpleasant acquaintances, plenty of employments, scientific, musical, or otherwise, and finally a house of one's own, and a home here is what few I flatter myself, would resist and give up; but if you ever thought seriously of such

a thing, all I can say is that you did not count rightly upon me. The strongest inducement to such a life as that, supposing such were to occur, as you may imagine, would be insufficient to change my views, such as they are, though I cannot help feeling that such a determination throws any prospect of quiet and settled happiness a long way into the future. My life has never yet been an easy though a happy one; I have always worked and thought of the future instead of enjoying the present; the feeling too that it probably always will be so, is perhaps the reason of my present tone of mind, joined as it is with a suspicion that life may not always be so easy and successful as at the present and past, and that to go again to London in search of new employment and new ends is, in fact, voluntarily entering again the battle of life after having once found a quiet and secure shelter. It seems, however, natural and unavoidable, and therefore must be so."

To his sister Lucy.

1st January 1857.

"I started about five o'clock on Christmas Eve by the Parramatta Railway, and reaching Parramatta in about three-quarters of an hour, took the coach for Windsor. This was a very old omnibus, and as I was inside and it soon became dark, I cannot describe the beauties, if any, of the country through which we passed. I may mention, however, to give you people a delicious idea of it, that we passed through the largest orangery of the colony, of many acres extent. After travelling twenty miles in four hours we found ourselves at the door of an inn in Windsor about 10.30 P.M. I never experienced, nor never will again, such a high temperature on a Christmas Eve—four fellows in a small attic—thick mosquito curtains—evening of a very hot day—windows wide open, but no perceptible effect. However, I arose on Christmas Day quite *solid*, and walked all morning about the cultivated plains and banks of the River Hawkesbury near Windsor. The country is fine in an agricultural sense, but not over picturesque. I sought for a dinner later on in Windsor, and while eating it thought how much amused you would have been to see me eating

my Christmas turkey and passable plum pudding with a fat old landlord and his growing-up family, including a rather showy young lady, and two or three more travellers, at one end of a long table in the deserted ball-room of the hotel. Dinner done, however, I soon quitted Windsor with no pleasant reminiscences, for as a rule I detest all Australian towns. . . . Passing through ordinary woody country, I reached Richmond towards evening. The prettiest of towns in New South Wales, so they say, but with no pretension to beauty but a few pretty cottages with exotic-looking gardens and green creepers. In passing on a few miles farther I crossed the River Hawkesbury by Richmond Point, and put up at an inn on the opposite bank in a lonely situation. The river is a broad deep fine stream, the Thames of New South Wales, but bordered by very tall steep alluvial banks, which the river is said to overflow in times of flood, occurring every few years. It was bordered by gardens and orchards, though rather too bare of trees, but the bushy hills surrounding the plains on all sides, and especially the ranges of bushy mountains in the distance, which I hoped to explore on the morrow, rendered the scene very beautiful when aided by a true Australian evening, delicious cool airs, and a calm clear sky, succeeding the dry winds and powerful sun of the day. Tea of *damper* and remains of Christmas goose ; large solitary bedroom. So ended my third Christmas Day in Australia.

"Next morning I started walking through the mists soon after six in the morning, and by eight o'clock entered a most beautiful, open, and very hilly country. It was considerably cultivated, and every half mile or so was a log cottage, of which the inhabitants were very friendly, and gave me all the directions and supplies of drinkables that they could. It was not, however, till I found an old bushman that I could get any information of a track across the mountains in the direction I wished to go. He directed me to go back the way I had come a considerable distance, and then cross the Grose river at *Ben Carver's*, and with the magical name of Ben Carver I with infinite trouble sought out my way at last and reached the Grose. Here I found the bed of a mountain torrent which drains the Blue Moun-

tains, but its banks had the chief attractions, for I was botanising, and I found here several remarkable flowering shrubs, which I have seen no trace of elsewhere, and also blackberries or brambles, and a single delicate and truly modest violet, the only one exactly like those at home that I have seen. There was also a small geranium, and the common sarsaparilla plant. As I had twelve miles before me to the next town, I started again without much delay and proceeded about five miles without much worth relating. The country was not here mountainous, but only hilly, woody land rising from the River Nepean, to which I afterwards found I was close, but as I was approaching some steep long ranges, I detected with my meteorologic eye a fine specimen of thunder-cloud rising up from behind them as being peculiar; low rumbling thunder soon confirmed my worst fears, and I gave myself up for a drenching. However, I had seen at intervals cleared spaces and railings, and I now came in sight of a well-established little farm and cottage, where I even applied for shelter, and was well received by an old woman. While the storm was brewing —and it was a rare one, with long forked flashes of lightning extending across the greater part of the sky, and sudden stormy squalls of warm air, though it was worse to the northward near Richmond—the old woman made some tea, and set out dinner for me, herself, and little boy, the viands being as usual the remains of the Christmas goose and pudding. I evidently shocked the religious feeling of the old lady by drinking my tea, the usual accompaniment of an Australian bush dinner, before she had said grace, which we hardly think of doing in New South Wales, though I was probably more really thankful for that cup of tea than for any other I ever drank.

"The dinner done, my prospect was not improved. The storm, instead of passing over in a definite small body, seemed extending everywhere. The whole sky was covered by dark heavy masses of cloud, which seemed determined to catch me wherever I went, and I looked forward with no pleasure to the six miles yet to be walked. Soon losing the path the old woman pointed out, I trusted to my senses to reach the top of the nearest range, upon the point of

which I fortunately discovered the track, and at the same time gained a fine view of the plains and winding river, which, although a second heavy shower came on, I was longing for you to sketch. Then I set off as hard as circumstances would allow me to walk, following up the path, which was the faintest track imaginable, even covered by bushes, in pushing by which the rain-drops continually drenched my legs and knees. But do you know that I have a secret satisfaction in walking any number of miles through these uninhabited, monotonous, but rugged, bushy, or thickly-wooded mountains? They are not picturesque, for the only other things seen are other similar ranges separated by long gullies, but they are wild and natural, and except a faint path, and a tree cut down or *barked* here and there, there are no traces of man. The old large gum-trees too have often a very picturesque appearance, or rather a desolate wild look—shattered by lightning, burned by the bush fires, or when blown over, sometimes falling into each other's arms, or with broken branches of large size supported in the most fantastic ways.

"After a long weary walk the path became more distinct, then began to widen into a good road, and after passing a few deserted huts, a tent or two, and such-like signs of life, I reached the broad main road from Penrith to Hartley, close to Springwood Inn, but nearer to a small eating-house at which I got some tea. On going away, the old woman addressed to me the question: 'Is it jewellery, or what is it?' which it struck me at last referred to my old botanical collecting box. I enlightened her on that point, but remained much disgusted, when I remembered similar remarks of the innkeeper at Windsor, which I had not understood at the time. *The assayer of Her Majesty's Australian Mint to be taken for a wandering dealer in false jewellery!* I had indeed hoped that my appearance, though in a now very dirty light suit of clothes and a cabbage-tree hat, would have saved me from such a fate. I made, however, the rather complimentary reflection that tourists, especially pedestrians and scientific ones, are unknown objects in Australia as yet.

"A few miles down the road brought me to the old

Pilgrim Inn, a very good house for such a place, just as 'the shades of evening,' etc., and as the rain was beginning to come down again. A hot cobbler of brandy and a comfortable early bed soon set me up again, although I had been out more than twelve hours, and walked somewhere near thirty miles under such circumstances."

The account of this excursion is written out more fully in the journal, and he there relates the following incident, which occurred the next morning :—

"*27th December.*—Getting out about six o'clock, I could have enjoyed sitting in the verandah for any length of time, looking round on the woods and on the mist only just rising out of the hollows. This is to me, a meteorologist, a distinct pleasure; to others it might only suggest damp disagreeable travelling. So probably thought *the gold escort* which now drove up in the little mail coach from Penrith. It consisted of four fine tall well-armed troopers, with their sergeant, the seats being filled up by two passengers, a lanky strange-looking Chinaman, and a little delicate and not bad-looking girl.

"I knew myself what it was to start about 4 A.M. of a cool, damp, misty morning, and ascend these wild mountainous roads on a jolting and altogether most uncomfortable open car, and the wearied, pale, half-sleepy appearance of this little girl as she timidly sat in her seat and watched the troopers enjoying a cup of coffee in the inn, excited my pity and moved me to the only gallant act I ever did, which was to send her a cup by one of the waiting girls. Her satisfaction and gratitude were evident, even as she scalded her mouth by trying to swallow rapidly the hot but reviving drink, and I felt in this as in many more things in this country, how the natural courtesy, true civility, and good nature which always seem to prevail amid nature, excel the studied etiquette and the miscalled politeness of towns. I allude, however, more particularly to the universal habit up the country of speaking to each person you meet solitarily, even if it be only to say good evening or good morning, and of freely asking or giving all directions or information about roads, distances, other travellers, or straying cattle or horses. Once when I omitted to say good-morning on passing a

remote cottage they bawled it out after me, and I am sure that if I passed many weeks in travelling in this manner I should become the most communicative of persons. . . . Gained Penrith by the usual road, and dining at Perry's Inn, took a place in the Parramatta coach afterwards, and reached home about 7.30 P.M."

To his sister Henrietta.

Sunday 4th January 1857.

"Within three years, all being well, I *will* throw up all that I have here, both with the hope of seeing you all again and with the intention of following more freely my own views, but not without the fear of meeting a far less easy or perhaps successful life in England. . . .

"But I see no reason why I should not inform you and the others at home of another step, and a rather long one too, which I intend to take before reaching home. Within a year I have been three trips about the colony of New South Wales which to me are full of amusement and instruction, though to most others I believe they would be unendurable; but in these I am merely stretching my wings for a much longer flight round the globe. How many miles I shall go, or by what path, I have not in the least decided. I mean, in short, after leaving here for good to travel at discretion, and not to terminate my wanderings at home until I have fulfilled the purposes I have in view, equally as I am doing now in another way. Though in this I may run some dangers, may spend some hundreds of pounds, and spend something under another precious year (spend it, too, away from home), you at least will approve of it.

"I am at present even more engaged than ever in various ways; my duties (self-imposed) of *meteorological reporter to the 'Empire Journal,'* I find quite onerous, and I am now, I believe, the sole acting meteorologist in Sydney. I have just lately been making up my meteorological accounts for the last year, for you must know that I keep quite a series of *books* which I have to attend to daily, weekly, monthly, and yearly, and they take a large portion of my time; but I intend after a bit rather to drop than increase my meteorological work, not, however, ceasing alto-

gether. One's subjects may be changed from time to time, provided it be done consistently and with a uniform ultimate object. I have lately started again at botany, though I feel it is almost one thing too much; but I do it with almost a greater pleasure than anything else, because it was my first *subject*, and one which I remember my mother always favouring. I have preserved a few plants out of our wood, as well as some which I gathered up the country, and am re-establishing my old herbarium in better style.

"You speak much in your letter about Unitarianism, and if I am to answer it and speak openly of such a subject, I must confess that I am never at all troubled by such religious differences as you refer to. My own views are so liberal and simple that the whole vast mass of different sects, including even the most of Unitarians, vanishes in the distance, and appearing only as a small object upon my religious horizon, draws a corresponding small share of attention from me; and though a curious, interesting, and certainly very complicated construction when closely examined, it is not to me of any importance compared with the other broad and vital questions which lie around. If I may call myself a Unitarian it is for this one reason, that of all sects I believe they alone are *charitably* disposed towards others. . . . If I gave any creed for my own belief, I should give it from the Bible, and say that I have faith, hope, and charity, but most of charity; and it is to me a horrible thing to consider how completely the whole system of Christianity, I may say, is opposed to this sentiment as well as to the general tenor of Christ's teaching. My charity indeed goes thus far, that I think it as absurd to say that any one will be unhappy after this life as to say that two and two make five. To define what you mean by God, and then to say He created anybody to be *damned*, is a simple contradiction in terms."

On 28th January 1857 he writes in his journal:—

"I have been not a little disturbed lately by my reflections on religious subjects. This has been caused partly by a little religious talk I have had here, very wide of my own opinions certainly, but chiefly by an attempt I made to explain the general character of my opinions to Henny,

when they appeared to me so cold and abstract compared with her heartfelt realities. But how can I help it? I was brought up in perfect freedom of opinion, for though I can remember my mother teaching me my prayers, I was then very young, and what religion I have since been taught at school or elsewhere only led me to inquire whether the whole was true. Natural science was my chief study, and I may say that I have become so impressed with the general character of natural laws of fact, and have become so accustomed to habits of severe and exact thought, that I must have a solid foundation for my religion or I shall have none.

"My father never so much as communicated his opinions to me in any way, nor do I know them now; whatever they were, they were founded in the truest and tenderest *humanity*.

"*Revealed religion* I had long since dispensed with; I know not how my doubts about it first began. It appears to me such a confession of imperfection in God's works to suppose that it was necessary to break their order to reveal Himself to us. God is seen, if anywhere, in the wonderful order and simplicity of Nature, in the adaptation of means to ends, and in the creation of man, to which everything refers, with powers capable of indefinite improvement. To suppose all this inadequate, to suppose Him leaving man confessedly without means of enlightenment for ages, and then to suppose Him only revealing Himself by breaking the order of His own creation and speaking through the mouth of a man, appears to me a most awkwardly-constructed belief.

"I see no evidence whatever of the inspiration of the Bible. The humane and perfect philosophy of Christ is indeed astonishing amid so much corruption, but one very probable suggestion explains it all. Christ was, no doubt, a great genius; and just as Newton was a genius of natural science, Mozart of music, Bacon of general learning, Shakespeare of *humanity*, etc., so Christ devoted his powers to *morality*, and wonderfully pure his teachings no doubt were. I feel no conviction of anything because it is in the Bible, and I examine matter and mind in order to found my conception of God.

"I perfectly comprehend everything that may be deduced from Nature as to *design*, *order*, unity of conception, etc., of

the universe, and I confess that both the theory of *chances* and that of *conditions of existence* are perfectly inadequate as explanations. The world is evidently but one vast organism full of motion and intelligence; it is not mere matter, for the very order and form of it express intention and mind. God is identified and inseparable from His works. But again I confess I do not see that as far as man's condition is concerned the world is perfectly adapted. Evil exists, and I see no way of completely reconciling it with any religious theory. A man falls from a cliff, a branch of a tree falls on him, or perhaps a man advanced in civilisation falls into a course of those refined evils which always accompany it. How is creation perfect here, or how can any recompense hereafter remove this imperfection, however slight, which now exists?

"I have been led to these remarks by reading two books, Whewell's *History of the Inductive Sciences* and Santine's *Story of Picciola*. The first proceeds systematically and profoundly through all the ideas of the mind, all the subjects of Natural Science, and having sufficiently grounded all this on the natural properties of man's reason, so that if man's existence be a reality, his deductions are equally real, he at last touches on the puzzling question of geology and Scripture. How disappointed I here was to observe his change of tone! Instead of *what is what must be*, what it is *in the nature of man to believe*, he here tells us what ought or should be. We must believe Scripture till its plain and evident interpretation is contradicted by demonstrated facts, but one must not put these forward too *rashly*, and we should endeavour to reconcile, etc. He is, no doubt, obliged to prove to others that his book leads to no unorthodox conclusions, but to those who are already not orthodox its conclusiveness and value just ceases where he leaves the thread of his demonstration and attempts to show this.

"In Santine's *Picciola*, read just by chance, I was surprised to find an instance of a man, full of science and knowledge, who, like me, felt that *chance* and *evil* exist in the world. The story is very pretty and very excellent. The demonstration of the order and adaptability of the

creation proceeds in a very nice and clear manner merely from the observation of a single plant, and I thought myself almost as surely saved from dark cheerless thoughts as Charney himself, when, alas, one paragraph ended all my hopes, and formed as bad a conclusion to Santine's prettily managed tale as Whewell's concluding chapter did to his great philosophical work. It is the following: 'Do not accuse God either of the errors of man or the eruption of a volcano.' [Why not?] 'He has imposed on matter eternal laws; and his work is accomplished without his being anxious if a vessel sinks in the midst of a tempest or a town disappears under an earthquake. What matter to him a few existences more or less! Thinks he then of death? No! but to our soul he has left the care of regulating itself, and what proves it is the independence of our passions. I have shown you animals obeying in all things the instinct which directs them, having only blind impulses, possessing only qualities inherent in their species; man alone forms his virtues and his vices; he alone has free will; for him alone the earth is a world of trials. The tree of happiness which we cultivate here below, with so many efforts, will only flourish for us in heaven. Oh, do not think that God can change the heart of the wicked, and will not; that he can leave the just in sorrow without reserving for him a recompense. What could he then have willed in creating us?' If Santine had intended to write a sort of parody or caricature of such demonstrations, he could not have written otherwise. What matter a few existences more or less to God? But what matter they rather to the possessors? And we are told from a much more *humane* authority that not a sparrow falls to the ground without God's heed. Again, 'do not think that God can turn the heart of the wicked and will not.' Why doesn't he, then? For there are certainly many wicked people in the world, and they cause much evil. If he does it finally, why does he delay? To explain it by free will and so on is mere prevarication, for in granting that instrument of good or harm he grants it with perfect knowledge, and is certainly to be accused with all consequences, just as a man that would knowingly lend a pistol to a murderer would be implicated in the crime."

No, the paragraph is indeed lame if intended for a proof, clever if a parody; and, at all events, it has done more than neutralise the good effect of the rest of the book.

"But though I find not God in this way, I find goodness in the human heart. I am susceptible of sympathy and love; I feel the dignity of man, the height he may attain, the pure happiness he may enjoy if he seeks it from a proper source; and those, if not standing in place of a distinct conception of God, produce equivalent good effects on my actions and intentions."

To his brother Herbert.

9th March 1857.

"I am very happy to be able to write by this mail from our new house, for I have a very pleasant account to give you of it. Our house having been furnished for a short time, we bid good-bye last Monday to the dry monotonous country of Petersham, and the frightfully dusty Parramatta Road, and I am now completely settled in my new apartments.

"The situation here is most delightful. You must imagine to yourself a small circular bay of blue waters, bounded on either side by rocky ridges, either covered by the original bush or ornamented by handsome houses or pretty Australian villas. The view out of the bay to the north extends across the harbour to the jutting heads of the north shore, which terminates in a perpendicular cliff, the *Middle Head*, and beyond which we have just a distant view of the North Harbour. On the south side of the bay is a circular white sandy beach rising with a moderate inclination to a few feet above high-water mark, whence a narrow alluvial plain or flat of fertile sandy land extends into the country about a mile and a half, between the steep and bushy sandstone ridges which form the country here.

"Just on the edge of the beach and of this flat our house is built; on our left hand is a pretty little villa, in which the old father of Mr. Daniel Cooper, the owner of the whole neighbourhood, lives; to the front, of course, is the view of the bay and harbour; and on every other side is as yet the original bush, which is uncleared except within a few feet of the house. It is here real picturesque bush rising about ten

feet high with a large variety of the peculiar narrow-leaved shrubs of N. S. W., and a thick undergrowth of fern and grass trees. The house is a very comfortable, suitable, but unassuming one, and it is, of course, doubly agreeable since it is our own. Just outside my window is the thermometer case—a wooden erection of singular appearance, designed to shelter the thermometer from the sun by sides formed of three separate boards. The weather now is very close and hot, and while I write the thermometer is at 88°. . . Except when other winds are blowing, a sea breeze sets in nearly every day, and has been lately particularly fresh. Most people at home do not know what a sea breeze is, I expect, but they would soon understand it here. It sets in a little before noon from the N.E., or nearly directly up the bay, increases till about sunset, and drops off again about 9 P.M. We scarcely felt it at the Petersham house, where, however, we had the more truly Australian climate, which my observations here will not so well represent.

"This place, too, is like a perpetual watering-place, for nothing could be better adapted than this beach for bathing. I have bathed the last four mornings between 6 and 7 A.M., and it is very delightful. Being within a few yards of the water, one can almost turn into it out of bed, and twice I have turned back again into bed after it, which is still more delightful. The only drawback are some weeds, which a little spoil the clearness of the water. By the by I was nearly forgetting the sharks, of which, undoubtedly, there are many in the harbour, since their fins are often seen above water, and a large monster of fourteen feet length, and a ton weight or so, was lately caught. But somehow or other no accidents occur, though hundreds of people bathe even off the most exposed rocks about the harbour. They keep, I suppose, in the deep waters, and are never known to come into a shallow bay like ours. Lucy, therefore, may be quite at her ease whether as to sharks or any other dangers which do not exist.

"The country about here is very different from the usual Australian bush, consisting of low *scrub*, or thick bushy shrubs instead of the eternal gum-tree woods which cover all the rest of the country. The strip of land two or three

miles from the coast consists of nothing but long ranges of hills covered by drifted sand with thin scrub growing on it, and with multitudes of grass-trees which give a most peculiar appearance to the vegetation. These are as in the drawing, and are about six or eight feet in height, the flower and stalk being not unlike an enormous bullrush, springing from hard spiny grass. I anticipate many delightful walks about the country, and I have, moreover, got a little research in hand, concerning certain *ancient raised sea cliffs*, which I have discovered round the harbour, as well as the *alluvial flats* which are connected with them. They struck me first near Petersham, where I found parallel lines of rocks in the middle of the bush, and proved them to be always at the level of about forty feet above the sea. At the head of the flat of Rushcutter's Bay I find them again very perpendicular, and, as I think, at the same height. Yesterday, in a walk I took with O'Connel, I discovered unmistakable signs of a second higher series of cliffs, perhaps 120 or 150 feet above the sea, of which a portion is to be seen distinctly at the north shore on a projecting head. The question is a very interesting one, being connected with the curious subject of the formation of Australia, and I do not know that these cliffs have ever been noticed before, being indeed seldom very noticeable objects. It is a pleasant subject too, from leading me long walks in the bush.

"In our walk yesterday we got to the highest point about, called Bellevue Hill, a name for once appropriate, as the view is, I have little hesitation in saying, the finest I ever saw, and quite beats anything else I have seen here. The circular white beach of Rose Bay lies almost at your feet, surrounded by dark masses of bush; the harbour, North Harbour, Watson's Bay, all the Heads, a succession of singular bold heads along the coast, the North Shore, Sydney in a favourable point of view, forty miles of flat bushy country, forming the county of Cumberland. The Blue Mountains rising distinctly beyond, and to the south the thin flat line of water representing Botany Bay, with flat barren-looking shores and high hills or ridges on the coast beyond, form a magnificent panorama; and to crown all, on the other side the blue waters of a real and the

largest ocean, the Pacific, give the additional feeling of grandeur to the view.

"There is one advantage of Double Bay I was almost forgetting to mention: it is eminently aristocratic, in fact quite the fashionable neighbourhood. Besides having the father of the Honourable the Speaker of the Legislative Assembly next door (and next door but one a fisherman's hut), the great auctioneer, Mr. Mort, the next richest man in the colony, has his house close to, and all the rest of the 'nobs' have villas or diminutive palaces variously disposed along the New S. H. Road. This road too, which leads us into town, is about the most picturesque one I know, winding over the ridges and crossing the flats of the bays, and giving one new glimpses at every point of the harbour,—quite a contrast to the dusty Parramatta Road, crowded with wood carts, bullock drays, and herds of wild cattle, and in character something like a railway cutting.

"You will be perhaps rather surprised when I tell you I have a sort of feeling of unsettledness very often if not continually. I feel as if I should not care if the mint were moved to Melbourne, or given up altogether, even though my home here is so entirely comfortable, and my little study and bedroom so perfectly satisfactory; I feel in fact as if I should like to take another short step across the world before long, and without doubt I shall sooner or later."

To his sister Lucy.

DOUBLE BAY, SYDNEY,
7th May 1857.

"You suspect me of being 'home-sick,' and I cannot absolutely deny it. Yet I think you have not chosen your term with exact propriety, for having been far away from home now for three years, and having never experienced its delights for more than a few months together for three years even before that, I cannot call myself 'home-sick.' I can indeed scarcely realise the happiness of living permanently at home with a steady, busy employment, and yet surrounded by those I trust and love. During such times, too, as I did spend at home, I used to be without regular occupation, and not always of a cheerful temper—everything did not always

run smoothly. I am quite aware that 'distance lends enchantment,' etc., and that in the best-regulated home, even such as yours, no one can live in continual unruffled satisfaction and happiness. But when I consider how completely solitary my life has always been in reality, I cannot help feeling what a sacrifice it has been to live so much apart from those who would naturally form the best friends for me. You blame me for not interesting myself more in other people. You touch here upon a very wide question, which is by no means new to my thoughts. Though in London I was very fond of Harry Roscoe, and liked also a few fellow-students; and though these and a few others, at divers places, may have to some extent liked me, they have formed indeed but a limited acquaintanceship, and I must confess that I disclosed to none of them a very little depth below the ordinary surface of my thoughts. Even with you and the rest at home, and with my father even, I cannot help feeling I was very reserved; and, in short, I believe my own nature is still a secret within my own breast, and that most of my behaviour must be thought to arise from very trivial causes, or else appear an enigma. . . . You yourself say that every one must have some inmost thoughts and feelings entirely his own; and accordingly the greater part of my thoughts and feelings as to what I really am, do and must probably ever, remain my own, unless, indeed, as is most highly improbable, they *all* come to be developed into the actions with which they are concerned, and by which all may judge them.

"You will think all this mystification perhaps, and very strange, yet it is said with the greatest seriousness, and has been for many years a serious subject with me; I have always felt indeed the weight of my own continual thoughts, and have sometimes almost wished to be *somebody else for a change.* Have *you* ever had that peculiar feeling? You say that 'it is not good for man to be alone,' but with this I cannot agree but in a very partial way. I cannot say of course that my disposition for reserve and loneliness was originally intentional on my part; it probably originated in bashfulness, which other people think, and which, no doubt, is, a very silly thing. Yet I ascribe to this disposition almost everything that I am, and believe that a certain amount of

reserve and solitude is quite necessary for the formation of any firm and original character. This is in fact almost self-evident, for if any one were brought up in continual intercourse with the thoughts of a number of other people, it follows almost necessarily that his thoughts will never rise above the ordinary level of the others, which, I think, is often practically exhibited in large families, especially of girls, when living very harmoniously together. Solitude, no doubt, produces one class of minds and characters, and society another; the latter may give quickness of thought and some other showy qualities, but must tend to interrupt longer and more valuable trains of thought, and gradually destroy the habit of following them, while solitude promotes reflection, self-dependence, and originality. These, I believe, I possess to a greater or less extent, and I therefore, on principle, do not altogether regret that my habits have been as you know them; still I do not intend to defend exclusiveness to the extent that I carry it. If you would like to be informed as to the number and intimacy of my friends here, I shall have no hesitation in telling you the actual state of the case. Know, then, that I never go—in fact, with one slight exception, never have gone, to a party, and have at last succeeded in impressing upon all friends the fact that it is no use inviting me. . . . You see I am 'unchanged' as much as you could possibly expect, but still I am more altered perhaps than you might argue from what I have told you. I keep away from people now, more from my own actual intention than on account of bashfulness or anything of that sort; in fact I am very little afraid of the grandest people now, and believe that, if it were my wish, I might soon become accustomed to the largest amount of society. Yet I find few or none with whom I care to be very intimate, and I derive no pleasure from ordinary society. The reason perhaps is that I am really so entirely and so continually occupied with my own pursuits and thoughts that I cannot bear to have them interrupted. That others may see this is the case, as you do too perhaps, I have no doubt; and I daresay I am generally set down as of a selfish, exclusive disposition. Here, again, is a point that I am well accustomed to consider in my own mind, and I cannot say that

it gives me much uneasiness. I do not in fact quite comprehend that to make oneself agreeable, to go out to parties, picnics, or to give most of one's time to society, is unselfish. To such *agreeable* people society is usually a pleasure, and in making themselves agreeable they are not always unselfish; I am myself by no means insensible to the *pleasures* even *I* might gain from society, and I fully believe my life would be more agreeable and pleasurable, if not more really happy, if I were as others. I cannot allow, in short, that I devote myself to continual work as I do merely from inclination, and to subject myself to the liability of being considered selfish, etc., when undeserved, is therefore, if anything, a sacrifice on my part.

"But lest I should really deserve to be called egotistical and selfish in my very letters, I must cease talking merely about myself."

To his sister Lucy.

DOUBLE BAY, SYDNEY,
16th June 1857.

"Another month is past and gone, and I find myself quietly settling down in my little study about 10 P.M. after spending rather a lazy evening, to employ the remaining couple of hours in a delightful duty. Life is chequered here as elsewhere. One is sometimes cheerful and pleased and contented with everything round you; sometimes a little dull and lonely; sometimes confident and hopeful of oneself; at other times less confident, if not disgusted and desponding. At present I must say there is nothing at all to disappoint or make me unhappy in the least, yet my hopes are so high that I cannot help feeling that they must be in the end disappointed. But in whatever mood I may be, there is one thing sure to please and make me happy, and that is my sisters' letters. . . . I am thought here as well as at home remarkable, if not foolish, for avoiding people's company, or at all events extending my friendship to a very limited circle. Do not believe that I have really one whit the less love in me, though it may seem rather thickly covered up. To prove this to you I will tell you that I have lately arrived at the opinion that there is no foundation for any religion but in the feelings of the human heart. For some six or seven years past I have

been chiefly engaged in learning science and taking the very evident views of things, and the consequence has been to show me *greatness* and wonderful *order or design* in nature, but no *feeling* or actual *good;* on the contrary, we find *evil* or *pain* prevailing everywhere almost equally with pleasure. It is in the human mind (made as we know after the image of God), but particularly in the feelings of love and friendship that I can find any indications of positive *good. Evil* is inseparable from *nature,* and no writer has ever explained satisfactorily why evil should exist at all. I can no more understand why it is to be found in material nature; but I discover in man certain properties and feelings which enable him in thought to triumph over evil, and form a conception or rather an expectation of a state free from it, and approaching, therefore, to perfection. How different are my opinions from those of many who call themselves Christian, yet are always talking of the original sin of man or their essentially sinful nature. I admit their weakness and the unhappiness thereby caused, yet place my faith in the fact I find to afford the possibility of perfection or superiority to evil, *i.e.* the sympathetic nature of the mind. It is perhaps well, at all events no harm, to talk thus seriously to those we can so well trust and love as a sister; but this is no reason why I should make a letter into a sermon or religious discussion, therefore to lighter and more cheerful subjects! . . ."

To his sister Henrietta.

17th June 1857.

"You wish me to direct and lecture you what to read and learn; I wish I were with you so that I could do it, and assist you over the difficulties of mathematics. The application of algebra to geometry is, I can remember, very disagreeable and difficult to understand. For my own part I have never had the courage to open the many mathematical books I brought with me; but what do you think I would do if I had opportunity ever again? Attend college and De Morgan's mathematical lectures! The utility of mathematics is one of the most incomprehensible things about it; but though I was never bright or successful in his

class, in spite of working hard, I feel the greatest benefit from it. Mathematics are like the *calisthenic exercises of the mind*, and make it vigorous and correct in form and action; but it depends of course on other circumstances how you apply and use your mind as well as your body. To go figuring about with your arms or legs is not the object of calisthenics. I think, therefore, you cannot waste time or trouble spent over mathematics—the more the better, for the present at all events. . . . I do not mean you to enter on the study of meteorology, for it is a most troublesome, extensive, and to most an uninteresting subject. I have, however, involved myself in it to an awful extent, and must go on with it, I suppose, whilst I am here. It is a most complicated subject, requiring a knowledge more or less of heat, light, chemistry, electricity, etc.; and is, therefore, a sort of difficult *scientific exercise* rather than a science itself. But the subject I have been most of all concerned in for the last six months is political economy. You will not know what it means or is unless you have read about it; but to those who interest themselves in it, *it*, on the other hand, is deeply interesting."

To his brother Tom.

1857.

. . . "It is often said that contentment is the chief essential to a happy life; I daresay this may be true in some respects, but I am very sure that it is far from being a correct maxim of life. A cat sitting and purring by the fireside seems to me a representation of this kind of happy life, but with this exception, that the cat can really manage to be quite contented, while if a man tries to be the same he will always encounter a succession of petty little things always enough to disturb his contentment. A man, therefore, should not aim at this kind of contentment at all; he should always look to something in the future; and the higher he looks the better, provided it be not so high that the impossibility of his attaining the point disgusts him. It is true the life of such a one must be made up in some sort of discontent; the few things already done, the short distance already passed over, appears disgusting; the present rate of travelling does not seem to promise anything more satisfactory, and when any position

is at last attained it turns out to be only like a mountain-top from which a higher mountain is each time visible. Such a life of disappointment may seem hardly a very desirable one, but I have a lurking suspicion that the sum total of a person's enjoyment is generally equal to what we should call in mathematics a 'constant quantity.' The small discontents of the one probably balance, from their great number, the one large continuous discontent of the other. . . .

"It may seem rather curious and liable to misconstruction what I am going to say, but I think it will harm neither you nor myself. It is with respect to the quality *cleverness*, which is generally thought so much of. At school and college I used to think that I was rather deficient in it; though I got a fair share of prizes, etc., it was at the expense of a vast deal of trouble; and other people seemed to do as much or more than I with half the trouble. Now, however, I begin to think I am rather more clever than I expected; yet I can never think but that other people could do just as much as I do if they only took the trouble. Be convinced on your part that if you only take the trouble to try you will find yourself as clever as almost any people you may meet; but mind you, whatever cleverness you have will be a very useless or even injurious article unless it is well worn, and at the same time worn in the right use. If you only work hard now and then, you will never work well, and will have reason to be discontented. Talents are things which become rusty by being laid up, so that when you have use of them again you are disgusted to find them not ready to your hand, and are very likely inclined to put them by again for a little longer."

To his sister Lucy.

Sunday Evening, 23d August 1857.

"It is not long since the last mail left with letters from me, and it is some weeks more before the mail will close. But a letter need not always contain the latest intelligence, and I know that anything I may feel inclined from time to time to write seriously to you will be read with more or less interest. I have always, indeed, much that I could say to

you, and this evening more than ever; and though my reflections be upon a very painful subject, that is no reason, so far as I can see, that they should be untold. . . . Not to alarm you about myself personally, I will tell you at once that an awful shipwreck occurred the other night within a few miles of this, which, besides exciting a great sensation all over Sydney, has more particularly affected the circle of the mint from sympathy with one of the members. I have often mentioned to you Mr. Hunt of the mint. I have always been inclined strongly to like him. . . . .As to age, he is a few months older than I am, but was appointed from the Government School of Mines in London, just the same as I was from the University College, London. Rather more than a year ago he received the news of his father's death in Paris, and his mother having been dead for some time, he had few relations left except two sisters of the ages of eighteen and twenty, who were then, I believe, in school at Bordeaux. After remaining there a short time it was arranged that they should come out to him here by the ship *Dunbar*, and in the shipping intelligence by the last mail their names were duly inserted in the list of passengers. In Sydney, Hunt had long expected them with pleasure. Very lately he had been busy choosing a small house on the North Shore, furnishing it, and even engaging servants, and was only waiting for the telegraph to announce the arrival of the ship. He was continually coming into my room, which commands a good view of the flagstaff, and when disappointed by the flags, always discovering that the ship was in reality not quite due yet. Last Thursday night a storm began, with heavy rain, black clouds, and very strong gales from the east. The next morning he was unusually watchful of the telegraph signals, but who has not known hundreds of people uneasy in such cases? Towards the middle of the day the rumour, however, crept rapidly through the mint that there was a large wreck somewhere outside the Heads. This was doubtless unpleasant intelligence, but no one saw any reason to believe it was the *Dunbar*, and the shipping list, when appealed to, contained a number of ships much more likely to arrive than the *Dunbar*.

"That afternoon I was detained unusually late by assays, and had no time to go out to the South Head, where close

beneath the lighthouse the wreck was said to have occurred. But at daybreak the next morning (yesterday) I got up and started with O'Connel for the Heads. After a five-mile walk through mud and rain we reached the lighthouse, and soon made our way to a low part of the cliffs, where a small number of persons, some from Sydney, by cabs and horses, the rest from the neighbourhood, were already collected. The place is called the *Gap*, being a partial break in the great line of cliffs opposite the part of the harbour called Watson's Bay, which, indeed, is produced by the same break. Here the cliffs fell to the height of less than 100 feet, and beneath there was a slight recess where a flat shelf of rocks, just a little above the sea level, ran out to a short distance. On looking down with the rest nothing was at first sight apparent but the huge waves of the Pacific Ocean, regularly rolling in, and each time entirely covering the lower rocks with a boiling sea of pure white foam, or now and then striking the projecting shelf, with a loud bursting noise, and throwing out a dense misty spray almost as high as the cliffs upon which we stood. But soon there was evidence of the wreck: small fragments of wood mingled with the sea-weed; portions of spars, or pieces of large timber, already quite rounded off by grinding on the rocks; bits of clothing, some apparently of silk, also long pieces of sheeting or bedding torn into shreds, and other clothing apparently tied up in bundles, were now and then seen. All these things were carried up on the top of one wave, lodged on the shelf of rock and exposed to view for a few moments till the succeeding wave enveloped them again in foam, and thus invisibly removed them. But as you will anticipate, there was now and then mingled with them objects of yet more fearful appearances. . . . But to leave descriptions perhaps of needless horror, we then walked along the cliff a few hundred yards to where the hull, or main part at least, of the vessel was yet supposed to lie, marked only by one or two fragments of spars yet attached by the rigging, or by loose rope ends now and then appearing at the surface. The ship appears to have run full on to the cliff almost below the lighthouse, some time during Thursday night, and to have gone to pieces and sunk almost immediately, unknown to any one on land,

and possibly, we may hope, almost without the consciousness of any on board. The fragments of it had drifted with the wind and waves into the mouth of the harbour, and there gave the first indication of the wreck to a coasting steamer entering the following morning. A few articles such as I have described were retained in the Gap by an eddy, and would there be out of reach till the waves subsided. You will now comprehend the utter destruction of the ship and all on board, and the mystery which for a whole day surrounded its very name. The papers of the morning in question announced, however, that a mail bag marked No. 2 *Dunbar* had been found, with other evidence which left no doubt about it, and then followed the mournful list, in which the Misses Hunt of course appeared as passengers. The sensation in Sydney this day was really extraordinary, and arises partly from the fact that almost every person in the town has passed a voyage at sea, and entered the very Heads which this ship has been the first, as far as they know, to strike. . . . The excitement was curiously increased when a second edition of the papers announced the suspicion that one man, if not more, was yet alive in the crevices of the great cliffs, a thing which all thought so perfectly impossible that few, I expect, had ever troubled themselves to look carefully. An hour or two later a further edition announced that by ropes the man had been hoisted 200 feet up the cliffs, such as I have before drawn and described to you, and was alive and well. More I cannot tell you till the account of this man is published to-morrow; but I have told enough for you to imagine the effect upon our feelings here. A slight anxiety was, once out of a hundred times, converted into a horrible certainty. Hunt's sisters must have perished in the most frightful of circumstances the night before. . . . It is impossible to conceive the full intensity of the disappointment and sorrow.

"*6th September.*—Hunt stayed away from the mint until last Monday, having been busy in searching all the time for some relic or trace of his sisters. . . . When I just saw him on Monday his look struck me very painfully, and he seemed very much altered. You can easily conceive that I feel the more for him as I have two sisters, who, although I have

brothers also, and many other relations, are quite as much to me as his sisters could have been to him; and the thought has not suggested itself to me now for the first time, that there are less terrible and unfrequent events that can separate people for ever than the shipwreck just described. There is no reason to fail in enjoying life because it may be taken away, or to avoid friendships because they may be broken; on the contrary, in my creed love is the most tangible form of immortality, and we can scarcely imagine its being in any way affected by death."

To his sister Henrietta.

7th September 1857.

". . . With respect to English composition, I can both understand your dread of such a formidable undertaking, and at the same time offer you some encouragement. But a year or two ago, since my living here, I can remember both my wish and despair of ever being able to write easily. But now I have become such a confirmed scribbler that I am half ashamed and sorry for my new acquisition. During yesterday (Sunday) and parts of the two previous evenings, would you believe that I wrote two long meteorological reports, one article on meteorology for the *Empire*, and great part of another for the same on railways, besides doing a deal of tedious and long meteorological work? As you observe, Parkes puts my letters often in large type, once reprinted an article, and has lately increased the type of all my reports, and an editor should be a good judge of what will take. But otherwise I should feel less assured about the quality than the quantity of productions that flow from my old silver penholder (which by the by is nearly worn out)."

To his Sisters.

17th November 1857.

"I have just received this evening two letters, one from each of you, besides a very pleasing little one from Tommy. I will not say that they are the most interesting or important letters I have ever had, or that I do not remember more interesting ones from you both, but there is something in them and something in my own state of feelings, which has

filled me with most serious and overwhelming thoughts. I have a second nature within me hidden to the world, yet directing all my behaviour towards the world. Towards you this second nature tends strongly to disclose itself, to throw off every covering of reserve or false modesty. My letters lately have all exhibited this tendency; I have always felt that a word, a single word, would explain so much to you, and would relieve me of a great load of loneliness, which I have for a long time borne. I cannot, I really believe, exaggerate to you the intensity of the feelings of my second nature. They are a reality; I rise up with them before me, and go to bed with them still upon my mind, and never take any ordinary enjoyment but as a relaxation from this pursuit. Indeed, I really believe that if I were about to die, which I always look upon as a possible contingency within the years to which I look forward, I should not much care except that *myself* would die before ever it had appeared, unknown, unthought of, and without benefit, except to the peace of my own thoughts. But now it occurs to me strongly as it has before occurred partially, that there is no reason why I should be unknown to you. If I am over confident, foolish, or vain, it will not make me worse to confess it to you. The truth and sincerity of what I say will be tried in the saying, and in the perfect loneliness of my second nature, for it never knew a friend or the shadow of an acquaintance; I begin to consider it quite a privilege to have two sisters, whom I dare to consider such friends.

"But I must come to the point and tell you, while I yet have courage, what are these inmost thoughts. I remember them as long ago as my first living in London or even before. They have grown ever since, and every day become developed in more fulness and distinctness; I consulted them when I came out here, although I was then greatly influenced by my father's wishes, and I have consulted them in the determination that I have come to, to leave Sydney within a moderate time, to be numbered in months rather than years. My whole second nature consists of one wish, or one *intention*, viz. to be a *powerful good* in the world. To be *good*, to live with good intentions towards others, is

open to all. To be unselfish, as they term it, to be a pleasant companion, or an agreeable fellow in the ordinary range of society, to marry a wife and make her comfortable, and so on, are all different ways of being *good*. But they seem to me to be very circumscribed and rather indulgent ways of doing it. To be *powerfully good*, that is to be good, not towards one, or a dozen, or a hundred, but towards a nation or the world, is what now absorbs me. But this assumes the possession of the *power*. To be as powerfully good as I could wish does not fall to the lot of one in a million; how slight indeed is the chance that my powers fall within the same narrow chance!

"My thoughts on this point shall be equally open to you, for I see no harm in speaking of oneself sincerely to those who will likewise listen to it sincerely. I used not to consider myself clever, in fact, I am almost sure I was not formerly above the average. As many boys as not could understand a thing as sharply as myself, but owing partly to my dislike of society, I have always given my attention so entirely to learning that I begin almost to hope that the result is appearing. You will easily understand that it is highly important for me to determine what my *mind* is, since it is the most important of the elements of the *power* I mean, and I really believe my conclusions are pretty impartial. I have scarcely a spark of imagination and no spark of wit. I have but a poor memory, and consequently can retain only a small portion of learning at any one time, which great numbers of other persons possess. But I am not so much a storehouse of goods as I am a machine for making those goods. Give me a few facts or materials, and I can work them up into a smoothly-arranged and finished fabric of theory, or can turn them out in a shape which is something new. My mind is of the most regular structure, and I have such a strong disposition to classify things as is sometimes almost painful. I also think that if in anything I have a chance of acquiring the power, it is that I have some *originality*, and can strike out new things. This consists not so much in quickness of forming new thoughts or opinions, but in seizing upon one or two of them and developing them into something symmetrical. It is like a

kaleidoscope; just put a bent pin in, or any little bit of rubbish, and a perfectly new and symmetrical pattern will be produced. I should not like myself to estimate the comparative worth of different kinds of mind, but after forming the conclusions stated above, the following passage from one of Sir J. Herschel's essays was not unpleasing:—'As a conquering, contriving, adorning, and imaginative being, the vestiges left by man are innumerable and imperishable, but as a reflective and reasoning one, how few do we find which will bear examination and justify his *claim!*' The field for reflection and reasoning, then, is not filled, there is yet an infinite extent of new country to explore and bring to use.

"I know it is said that knowledge is power, and I think the faculty of producing or discovering knowledge must be power of a higher degree, but I am quite aware that in the sense in which I desire power other qualities may be desirable, if not necessary. One of these is *personal power*, the employment of manners, language, persuasion, to accomplish an end, and of these I am quite sure I possess *nil.* I do not blame myself much for their absence; it is owing to a great extent to my animal constitution, but I acknowledge that I have done, and am doing, nothing to make the animal bend to the mental constitution. There is here, doubtless, a great deficiency."

To his sister Lucy.

11th January 1858.

"To come to my own affairs, life here is very quiet, not one evening in the month do I spend anywhere but in my own little study, to which I am becoming really attached. Fancy a little French-windowed room close to the 'sad sea waves.' A square centre table, covered by a neat walnut-marked oil-cloth, from which an inkstand with a sort of little dock full of pens, pencils, paper-knives (most of them mementos), a couple of large observation books, a pile of two or three books in process of reading, and a miscellaneous collection of papers in process of writing, are never absent. Close at my back and right side is a neat and well-made escritoire and side-table, whose five drawers are filled by collections of almost everything that I ever scribbled (one drawer being indeed a secret and almost sacred repository by means of a

Hobbes' lock), while the top of the table is loaded by a travelling-desk, a large atlas, a portfolio of your drawings and other precious things, as well as other books, etc., of less immediate use; at one side of the room is a large glazed bookcase crammed with my more valuable books (the two lowest rows particularly please me), the surplus finding a place either on a home-made series of cedar shelves fixed to another part of the wall, or hiding in various drawers or cupboards; the large chiffonier cupboard below the bookcase is now partly appropriated to photographic apparatus, while the mahogany camera, fixed on its three-legged stand, serves to fill, in a very knowing way, an adjoining nook which was always before distressing to me. Barometers or other instruments are either suspended or recline in the other corners and nooks of the room. Now, too, it is quite a picture gallery, and indeed you need not come here to see the pictures, for they are all your own presents, or sent through you. There are two or three scenes near West Kirby, Wales, etc., two or three which look like the Thames, one beautifully painted scene with bush and trees which you say you copied in Italy, but which pleases me amazingly; and lastly, but most particularly of all, a photograph of Pisa, and a wonderful photograph of Uncle Dick [Dr. Roscoe, his uncle]. My room is completed by the harmonium and a small neat music-stand filled with music. I have lately added a superb and most convenient music-holder of my own design and manufacture. But you must not think that, however much my life here is in most respects to my liking, I have any thoughts of prolonging my stay here beyond the shortest decent limits. I feel as if I could give up everything that I now enjoy, and enter in London, a life of labour, trouble and small gains, if it would be more likely in other ways to bring me nearer my desired end. I have explained to you before what I seek, and in seeking it one must not be too nice about ordinary common sense, prudence and so forth. I cannot stay here much longer, or my best years will be gone; I shall have suffered in mind from the want of other minds to communicate with, and in body I shall be unfitted to live again in a cold climate. I wish, too, to see a little of the world before I again settle in civilised

old England, where there are no holidays; indeed, I contemplate travelling for at least a year in some quarter of the globe, and if I only stop a year longer at the mint I shall be about twenty-five years old before I can fairly start again in London. If I said, therefore, that I had determined to make this my last year at the mint I should not be far wrong. It is a serious step to take, I will allow, but none except yourself, or Henny and myself, can understand it or judge it; but whenever I am occupied in planning and projecting, one thing always occurs to me now, and that is the *Dunbar*. It is perfectly right to lay out one's life before one, to invest a large capital in it, as it were, even with the hope of very distant and uncertain returns; this indeed is the only way of using life with true economy and effect. But always remember that you cannot effect an insurance upon such capital; it is life itself, and life and every hope and every return, except the inner return of a peaceful mind, may any day suffer a sudden shipwreck. I have just begun to read *Jane Eyre* for the first time; I am only half through it, and will not yet express any opinion on it, but one passage struck me so much that I must copy it out for you, chap. vi. p. 55: 'I hold another creed, which no one ever taught me, and which I seldom mention, but in which I delight, and to which I cling, for it extends hope to all, it makes eternity a rest—a mighty home, not a terror and abyss. Besides, with this creed I can so clearly distinguish between the criminal and his crime; I can so sincerely forgive the first, while I abhor the last; with this creed revenge never worries my heart, degradation never too deeply disgusts me, injustice never crushes me too low, I live in calm, looking to the end.' I never before saw my creed written out, but here it is. This is what Helen Burns says, the schoolgirl who soon dies of consumption, but I suppose it is the creed of Charlotte Brontë, who wrote it, and, if so, it is enough to give me an interest in her. I recommend this to you. . . ."

To his sister Henrietta.

28th February 1858.

"You say that I seemed from my last letters not so much occupied with *music*. This can scarcely have been the case,

for music is always to me the same, a condition of my existence, a part of me. I believe I could live a *life of music*. If our physical nature did not interfere I can almost conceive it possible that a man might play music *ad infinitum* and still never tire. Have you ever felt, when much pleased and interested by several different things in the same day, as if you would like to have a separate existence for each, something in the way that in *vingt et un* you can divide a pair of similar cards and play two or more separate hands? Now I think that nothing less than a lifetime would quite satisfy my musical thirst, while I find with concern that a single hour per day out of the twenty-four considerably interferes with other affairs equally or more important. Music, then, ought to be a rare but still legitimate and occasional delight. I greatly envy you with your music master, and lessons, and new pieces, and concerts, and other grand opportunities. Here, I come to a stand, surprised and pleased, if I hear a (supposed) young lady strumming in a second-floor room in a Sydney street. . . .

"The Philharmonic concerts, with their questionably-performed overtures and symphonies, have now ceased, because the concert-room has, in the most Gothic manner, been converted into an auction-room. Of musical as well as dramatic 'stars,' the Sydney sky from horizon to zenith has been *quite clear* for at least six months. You can understand then, the dull and miserable thing that it is to ramble through the beauties of all the chief oratorios, etc., and yet be beyond the reach of all those grand performances I hear of in London and Liverpool. If one of the Exeter Hall oratorios (at 3s.) took place here, and the price were raised to £10, I feel pretty nearly sure I should go. About two weeks ago I fell upon Beethoven's *Mount of Olives* and *Pastoral Symphony*, and instantly buying them at the price demanded, have since played scarcely anything else. Many pieces in the first I have mastered, I really think, better than anything before, most of the latter is beyond my power altogether, and I can only here and there catch an air. Of the *Mount of Olives* I can only say that it contains some things of the beauty and sublimity of which I had before formed no conception. It is like gaining a new insight into a thing. My two favourite

passages I copy out ; they are the simplest parts of the whole, but surpassingly beautiful and striking. Beethoven's music seems to me characterised by 'being *full of soul*,' every note seems to be a thought, or at least a part of an expression, while the whole seems to be an inspiration rather than an exertion of mere musical knowledge, art, or talent. Of all other composers Weber seems to me most nearly to resemble him in this ; Haydn, Mendelssohn, Spohr follow next in this respect. Mozart and Handel, though perhaps greater than any, on the whole, are distinguished, especially the latter, by the preponderance of the musical art, *pure* or combined with the dramatic.

"These thoughts and criticisms I give quite freely, although I know I have no foundation or opportunity of judging, and I wish you would do the same of what you play. . . .

"I am glad you find political economy tolerable. The *Wealth of Nations* is perhaps one of the driest on the subject. You will perceive that *economy*, scientifically speaking, is a very contracted science ; it is in fact a sort of vague mathematics which calculates the causes and effects of man's industry, and shows how it may best be applied. There are a multitude of allied branches of knowledge connected with man's condition ; the relation of these to political economy is analogous to the connection of mechanics, astronomy, optics, sound, heat, and every other branch more or less of physical science, with pure mathematics. I have an idea, which I do not object to mention to you, that my insight into the foundations and nature of the knowledge of man is deeper than that of most men or writers. In fact, I think that it is my mission to apply myself to such subjects, and it is my intention to do so. You are desirous of engaging in the practically useful ; you may feel assured that to extend and perfect the abstract or the detailed and practical knowledge of man and society is perhaps the most useful and necessary work in which any one can now engage. There are plenty of people engaged with physical science, and practical science and arts may be left to look after themselves, but thoroughly to understand the principles of society appears to me now the most cogent business. The Associ-

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ation for the Advancement of Social Science is a great step certainly, but it seems to me as yet scarcely founded on a sufficiently wide basis; I do not think also that it should be confined so much to *details and practical* suggestions."

To his sister Henrietta.

18th April 1858.

"Thus[1] have I spent a whole Sunday evening from tea-time till nearly 1 A.M. Mrs. G. and other visitors have been here to-night, but I have been so buried in my subject that I could not tolerate their talk, and so scarcely saw them during ten minutes at tea and ten at supper. I often wonder whether my sisters will tolerate my abstractions when I live with them again (if ever), will they remonstrate and bother, or will they sit up and help and advise me in my work? Sometimes lately when I have got *into a subject*, I have worked up to 4 A.M. in the morning. As to this evening's work, I hope it will give you a fraction of the pleasure and interest it has given me. To be interested is to be happy, and I believe I am one of the happiest people alive, because there is scarcely a thing I could lay my hands on but I could spend an evening with it if need be. To prevent one thing from interfering with another is my only difficulty."

To his sister Henrietta.

9th June 1858.

". . . I think there are no characters one loves so much as great musical composers. Mozart, Beethoven, and Mendelssohn seem to be the intimate friends and benefactors of all who hear their music: what a privilege thus to delight millions of people for ages to come. Those three poor Germans will be known when Victoria is forgotten, and London perhaps will be distinguished as the place where the *Messiah* was first performed. But it is an interesting question with me whether musical writings will have the everlasting character of poetry, or whether it will become antique and superseded. David's psalms, Homer's *Iliad*, Shakespeare's plays, and Milton's *Paradise Lost*, will be read as long as there are readers. Will the *Requiem*, the *Messiah*, the *Engedi*, and

[1] In writing a long criticism of Mozart's *Requiem* and Beethoven's *Engedi*.

Elijah or *St. Paul* be played, and perhaps rearranged for instruments of improved construction? Very probably it is so, and the last century scarcely yet terminated is a grand musical epoch that may never recur with such original beauty and grandeur."

To his sister Lucy.

9th July 1858.

"My monthly despatches will this time be comprised within a small space, for the mail has not arrived, and I have consequently no letters to answer. Life here is as quiet as usual. There is nothing in the least striking to tell you of. It often occurs to me, is it well to live thus undisturbed? Will the future be better than the present to one who makes no present sacrifices? Granting that a given position is good, may it not be wisely relinquished if a happier one may be attained, even after much trouble? What man of sense that had a hundred acres of land would dig a single acre, and sowing it with potatoes, rest contented that he is not likely to starve, and owes no man anything? Will he not pinch himself and go through years of toil that his whole estate may be rendered a productive farm? It is just so with me. I have plenty of potatoes to live on, and might lie down in sunshine if I wanted nothing else. But may I not fairly believe that I have other capabilities, that my soil will bear other and better products if properly tilled? and am I to neglect this for the sake of the trouble? You already know so well what are my intentions that I need answer none of my own questions, but you will understand that self-proposed arguments, such as the above, are now and then necessary when transitory misgivings arise. It requires no little courage to do as I propose, and I am not naturally by any means courageous. To abandon a good income of potatoes will be thought madness by all those potato-growing friends who have no idea that corn, milk, and fruit might be raised off the same ground with a little extra trouble. . . . I do not know whether I have before explained why I desire at once to leave Sydney. It is because I believe my education is but now continuing, and that by staying here it is checked, and irretrievably deferred.

I have gained many advantages by my residence at the Antipodes. If I could again be left to decide, quite unbiassed by the opinion of my father and others, whether I would accept the assayership, it is perhaps more likely than not that I should do so. But I feel sure that a few additional years' savings (surplus of potato crops) are far outbalanced by the irremediable injury to future fruits of greater value. I have done something here, but a change of life from easy to hard and busy, from Sydney to London, a better knowledge of the world both physical and human, the mixture with enlightened men and great objects, the abandonment of a pleasant but scarcely profitable seclusion from all society, and thus a diligent use of the advantages of London, are what I seek. Yet I fear these things will not increase my potato crop! . . . I am at present very busily occupied with meteorology. I left off my regular observations at the end of last month, and am now working out all the results and arranging all information I have concerning the climate of Australia, so as to publish it if I like. I shall then have pretty nearly finished with meteorology. I don't think more than a month more will be necessary for this. I have then plenty to do with assaying, photography, botany, and preparations for my travels, to occupy five months more, so that I expect the time will pass very quickly. . . . In working up the climate of Australia I have read a great many books of voyages and expeditions, and take quite a romantic view of wild primeval forests and cannibal blacks. *Robinson Crusoe*, *The Swiss Family Robinson*, and *Masterman Ready* I used to think amusing but childish fiction, yet the true incidents which happen in Australia or the 'Islands' (by which we here denote Polynesia), are quite as singular and interesting, minus a little of the *couleur de rose*. England must be a very prosy conventional place, where there is no square yard that 'the foot of white man has not crossed,' and where the aboriginals were exterminated some 2000 years ago."

To his sister Lucy.

14th October 1858.

"I have already posted one letter to you by this mail, but the letters of two mails from England having happily

been delivered to-day, I have much more to say, and also an opportunity of sending it by a steamer which leaves here to-morrow on purpose to catch the mail at Melbourne. I have only received two letters, one from Herbert and one from ——, the last a serious business letter. . . . As you may believe, it is no light matter for me in my place to receive such a letter, and I feel at the moment as if I had more upon my shoulders than ever before, even than in that dreadful week which passed a sentence of transportation upon me. It is one of those things which strike you with the chill of money, and which sums up all that is desirable, good, and necessary, in fact life itself, into a total income of £ s. d. Show that you can provide this cold metallic coin, and virtue, worth, enlightenment may be followed as ornaments and accomplishments. Pleasure is measured simply as the expenditure of so much money, and he who lives at £1000 per annum is in the world's eye five times as happy as he who spends but £200. Is a man thus posted up in his cash-book? Is everything thus 'closed with golden bars, and opened but with golden keys?' . . . But I am very glad, while about to take a step which I can never retrace, that the most chilling view of things should be presented to me. Nothing could have come more in the nick of time than this letter, for only a day or two since I was hesitating whether to wait for the mail before giving notice of my intended resignation. Now I scarcely waver in my resolution, but I act with the greatest reluctance and heaviness of spirits. . . . I may find out my mistake some day, perhaps I may drawl away a wretched existence sometime, but I declare that in my present state of mind I am ready to throw myself into the battle of life for mortal combat, and to strip myself of everything for the purpose of paying debts of affection while I can, and then of providing as far as possible for a successful issue. I verily believe I do not, and will not, spare myself, but it must be a cause of increasing regret if I inflict anything upon others. . . . As to the college I do not now decide, but I am sure that another year's regular hard study, especially at my increased age, will be invaluable, and its loss would be regretted to the end of my life. I am often now much vexed at my want of

knowledge which I should in another year obtain, and have already been impeded by it. It has occurred to me that in returning to England I may seem to disregard the opinions and wishes of my father, who certainly influenced me to come here, but I do not think it is so. Could he have foreseen things as they are, I believe he would not have sent me here —he could not have been aware, as I was both reserved and but little conscious of it myself, of my entire devotion to serious views and studies, and he had also a somewhat exaggerated idea of my prospects here. They have been better than could reasonably have been expected, but my father seemed in his letters slightly disappointed. It is not true, also, that he wished me to stay here. On the contrary, he distinctly said that he could not bear to let me go if, after some years, he did not hope to see me again. And now that he is gone, is the bond which connects me with home entirely dissolved? and are the circumstances entirely changed which in his opinion rendered a return judicious? But I am quite certain that if at the time I had stated my wish for further study and a different start in life, he would have immediately agreed. Am I wrong, then, in carrying out such views at present, or is it much worse to refuse a good salary after four or five years' benefit from it, than from the first? . . . I feel the cold weight of the decision I am making as I never felt it before, although it was always a serious subject."

To his sister Lucy.

SYDNEY, *8th November* 1858.

". . . The weather has been too changeable here of late to admit of successful excursions, but I am still stiff in my limbs from the last, which was an out and out one. Mr. Hunt of the mint agreed to go photographing with me, and accordingly we started about 2 P.M. last Saturday in company with Mr. MacCutcheon (mint clerk and my successor) for Middle Harbour, intending to camp it out all night and photograph in the calm clear air of early morning. Hunt's boat is a beautiful light skiff or wager boat named the *Terror*, and accounted the third or fourth best boat in the harbour. Still, with Hunt's good management it is very safe, and it soon carried us, with a very large amount of luggage, round Middle

Head. Here our photographic zeal was so incited by the bold water-worn cliffs that we decided on landing my lighter apparatus, and taking them off, as the phrase is. The sky being very cloudy, and the cliffs looking away from the sun, this was not easily done, nor, after spending an hour and a half over four trials, did we get at all a perfect photograph. When Hunt and I had again packed up we were surprised to see the boat drifting away with no one apparently in her; MacCutcheon, who had engaged to keep her afloat away from the swell on the rocks, having lain down in the bottom of the boat and gone to dreamland. Shouting was of no avail, and after some twenty minutes we were much relieved to see an arm appear above the gunwale, and then a fellow looking about as if he did not know where he was. We now proceeded through the panoramic scenery of Middle Harbour, passing a succession of small coves with white sandy beaches, rocky headlands, picturesquely covered with trees, evergreen shrubs, and staghorn ferns, and better than all, little shady dells, where a gentle stream trickles down among moss and lichen-covered stones, between which grew luxuriantly the most beautiful shrubs, creepers, ferns, and orchids, again over-arched by noble old gum-trees. The photographer cannot leave these alluring little scenes without a pang of disappointment, and yet if he attempt them he will find that he cannot convey to the plate an impress of one-tenth part of their beauty. As we were now bent on taking the Willoughby Falls, we went at once up Waterfall Bay, at the head of which the falls are. Before we got there the sun was set, and the place was examined more with an eye to the comfortable lodgings it could afford than to its picturesqueness. At the falls there was plenty of water, but no sleeping-place. One overhanging rock near at hand, which would have done nicely, was already engaged by some occupant, of whom blankets, tin pots, candles, firewood, and matches were too plain a sign. As he was probably a black man, or, still worse, a drunken white man, and would probably arrive home some time in the night, we cleared away in the boat to the other side of the narrow bay, where we at last selected a small flat space of land upon a point, and just above the sea water. Fresh water we had brought with us from the

falls, so we at once set to work in that co-operative busy manner which only those who are intensely and personally interested in the result employ, to erect the tent before dark, and cook the meal, for which we had so good an appetite. In a very short time we had a large sail forming a one-sided tent sloping towards a rock; at one side of this was our fire, lighted against an ancient log of wood blackened in some bush fire, or perhaps by a previous camping party. Water was soon boiled, and tea made, mutton chops were soon fried on forked sticks, and a quite elaborate meal was laid beneath the hut on the ground, well covered with oilskins and blankets. It was now dark, but candles and a lantern were forthcoming, which swung suspended from the tent pole and illumined our camp. Thus within our tent was civilised comfort, but stretching out your head, you looked around on a beautiful and perfectly natural scene of placid clear blue waters; on rocky shores sculptured by nature, and variously decked with shells and bright-coloured sea-weeds; on high, bold, rocky slopes, forming a succession of picturesque headlands, and including in every angle small rustic dells, the interior beauties of which were present to the mind, but not the eye; and on the sky above. All was now wrapped in darkness, so that sea and land and sky were nearly indistinguishable, but the impressions of beauty all seem to me present to the mind, even when thus veiled over; sounds, too, which are unnoticed but in the dead of night, are then strangely suggestive of pleasant images, the gush of water at the waterfall, the roar of the great Pacific waves upon the coast not far distant, now diminishing, but again bursting out as the large seventh wave recurs, the rustle of the tree-tops, exposed to the motion of the upper air, the wash of the rippled water near at hand, the flickering crackle of the camp fire re-echoed from a neighbouring rock, and the various cries of animals, not wanting here, but less harmonious than elsewhere,—all these suggest through one sense, the beauty or power which another sense usually informs us of by day. I confess to sleeping with difficulty on the ground; I am not naturally sleepy, and a little excitement of my thoughts drives sleep away more than the want of a mattress, to which the sharp intolerable buzz of a persecut-

ing crowd of mosquitoes, every now and then attacking you with their acutely-poisoned little daggers, strongly contributes. At last I could stand the tent no longer, but rising and making up the fire, now half out, and wrapping myself in my shawl (a bequest from you), I ascended to the top of the overhanging rock, and on that hard, but ærial bed, I watched the stars until I slept. Daylight was not unwelcome, but it came half obscured in doubtful-looking clouds. We exerted ourselves early, however, commencing with a refreshing bathe in the deep clear water into which the boat with a single push floated. Then leaving MacCutcheon to prepare breakfast, Hunt and I proceeded to the waterfall, dragging up our apparatus by main force. By half-past six we took the first plate, but rain at the moment began to fall. After breakfast, however, at which we each consumed four eggs, the weather cleared up in some degree, and we made repeated trials on the same subject, until satisfied that a more satisfactory result could not be obtained. Hunt has since printed and mounted one of his plates, producing a really beautiful picture, and certainly the best he has taken. My plate is smaller, and has a slight defect, but otherwise ought to turn out even better. Our excursion was now in fact ended, for the day was hot, and the wind from the north-west, and the clouds wild and threatening, indicating unmistakably a 'southerly burster,' or squall, during the day, which would prevent us rounding Middle Head, unless we did it quickly. With little delay, therefore, we rowed home to Double Bay, reaching there by 1.30 P.M. Hunt and MacCutcheon then went homewards in his boat to the north shore. Before quite reaching it, however, the thunderstorm burst with a tremendous squall from the south, tremendous torrents of rain, and large hailstones; they were instantly drenched, but otherwise all right; I congratulated myself on the prudence which had brought us home just in time. The afternoon was fine, but a second white or cloudless squall followed in the evening: this storm was one of the most violent I have ever seen here, only lasting about half-an-hour; the rain which fell was, I think, an inch in depth, or nearly one-twentieth part of what falls in England during a whole year."

To his sister Lucy.

9th December 1858.

"Another month is gone, and in a very few weeks I shall no longer belong to Sydney. The change is one of some magnitude, but seems to steal upon one very quietly. Perhaps it is in consequence of my slightly-increased years that I feel very cool under all circumstances. . . . It would now be one of the greatest disappointments possible to me, if circumstances prevented my immediate return home; but this has nearly happened.

"I will tell you that I might have a fair prospect of an income from £1000 to £2000 a year in Melbourne. Mr. H——, a chemist, whom I knew here, has lately moved there, and in a few months established a gold-melting and assaying business which already pays nearly £2000. He much wants a partner, however, and proposed to Mr. Miller to join him. Miller got two weeks' leave of absence, and went to Melbourne to see how the truth stands. He returned yesterday very well satisfied with everything, but I do not think he will finally decide on leaving a fixed salary. H—— is equally willing to take me, but told Miller that it must be for a permanency. This was my salvation. . . . I had almost made up my mind, that I could not refuse such a chance of making money if I could hold it for say two or three years. But a *permanency*, or even the nine years' partnership, which H—— would require, is *altogether out of the question.* I would almost as soon hang myself at once, as the surest way of procuring a permanent settlement. . . . I have thrown over the Melbourne idea almost entirely, and with no small relief to my spirits. It would indeed have been difficult to reconcile myself to a sudden change of plans which would defer for several years *everything which of my own inclination I desire.* I have no love of money, no love of an easy life, and no love of an ordinary consequential position, all which I might easily attain in these colonies. What I do, concerns myself alone, unless it is positively injurious to others. . . . Now I have no fear that any of you will ever reproach me with this, but, to be on the safe side, I would freely engage that so far as

my present or future possessions go, any necessary or reasonable assistance shall be yours, in short everything that I have should be yours, rather than that I should act selfishly. But I cannot believe that any of you would ever wish me to sacrifice everything that I hold dear *after* my love for yourselves. It is rather a grave business to refuse an almost certain fortune, such as I should doubtless obtain either here or especially in Melbourne, but so it must be, and upon my own shoulders will be the consequences. Life has run smoothly with me as yet, but I am quite aware that it may not always be so, and I hope that you also look upon it in this light. . . ."

CHAPTER IV.

1859.

As will be seen from the previous letters, Mr. Jevons made good use of his time during his residence at Sydney. He began the study of political economy with much interest, and he also read one or two books on logic. At meteorology especially he worked hard, and on 24th August 1856 he commenced sending weekly meteorological reports to the *Empire* newspaper, which he continued without intermission up to the end of June 1858. For about a year he was the only acting meteorologist in Sydney, and his observations were subsequently made use of by the Government in compiling an account of the meteorology of New South Wales. He frequently contributed to the *Empire* letters or articles on various subjects, and was several times gratified to find his articles reprinted in the summary for England. In 1857 he sent home a paper on the "Cirrous Form of Cloud," which appeared in the *London and Edinburgh Philosophical Magazine.* In the same year he commenced monthly meteorological reports in the *Sydney Magazine of Science and Art*, and also wrote several papers for the magazine. He published in Waugh's *Australian Almanac* for 1859, "Some Data concerning the Climate of Australia and New Zealand," a paper over fifty pages in length, which is best described by his closing words:—"My object has been to present in an available form such accurate numerical data as are attainable, and secondly, to group together general information as to the winds, rains, rivers, floods, the geographical features of the country, and the meteorological circumstances of this part of the globe,

so as to show what remarkable problems have to be solved, and what interesting connections of cause and effect may ultimately be traced and proved."

He had made use of his occasional holidays to take excursions from Sydney, and his journal contains full accounts of trips to the Illawarra district and the Hunter River. In January 1859, after he had resigned his post at the mint, he visited the diggings at Braidwood, and then returning to Sydney, made final preparations for his departure. He determined to go by land to Melbourne, and then to sail to Callao, the port of Lima; afterwards he would cross the Isthmus of Panama and make his way to the United States, and especially to Minnesota, where he expected to meet his elder brother, Herbert, who had lately gone to settle there, in the hope that the country life would suit his health better than England.

To his sister Henrietta.

SYDNEY, N. S. W., 30*th January* 1859.

"Yesterday I returned from my trip to the Braidwood diggings, and for a few days I enjoy the comfort of a quasi-home. You might perhaps be interested by an account of what I have done and seen in this primitive country, but I prefer, in the first place at all events, writing some sort of answer to an interesting and pleasing letter from you which met me here. I did, some time since, write you a very serious and rather uncommon letter, and you may depend upon it that what I said I also meant to say. But I am glad to find that it was not misunderstood by you, and that in fact you agree with me as far as could be expected concerning the comparative values of an agreeable and a useful life. It could never be supposed that in the course of a rather gay stirring life, such as you have been lately spending, there would always be opportunity for serious work or even reflection; these things are not always right nor necessary. . . . I can perceive that your own views of the proper uses of life coincide satisfactorily with my own, and we enjoy a common understanding upon that basis, which is a considerable privilege. But in conducting yourself upon that basis of conduct, you have not, I think, sufficient patience and confidence, which leads to a certain degree of

wavering and inconstancy, and the consequent dissatisfaction of your own heart—'the battling,' as you term it, 'of your two natures within you.' Do you not perceive that a girl of eighteen years, or even a man of twenty-two or twenty-three years, can really do little or nothing in the world? It is only an extraordinary precocity of intellect, very rare and scarcely to be desired, which can enable them to do it. It is quite sufficient if, after a life of forty or seventy years, a person can look back and say that he has done something, not so much as he would have liked to do, but perhaps nearly as much as his innate nature and circumstances enabled him to do. . . . How unreasonable, at your age or mine, is all impatience to have any absolute result, to see a stroke of the work struck, or a nail driven home! Sufficient that you are considering its magnitude and importance; that you are looking about and seeing what results others achieve; that you fix your attention on the greatest works hitherto achieved, and wonder how they were done; that you steadily and patiently exercise every smallest member of your mind and body, uncertain upon which muscles or upon which faculties the strain will fall; or that you collect and learn to handle skilfully the tools which you feel sure will be of vital use. Be in no hurry to start upon the actual work, almost draw back from it, that your preparations may become all the more complete. Take it coolly and confidently, and leave the result, as I have said, far in the future. . . . I think you do not duly appreciate the comparative importance of *preparation and performance;* or perhaps, as I may illustrate it, of capital and labour. You desire to begin and hammer away at once, instead of spending years in acquiring strength and skill, and then striking a few blows of immensely greater effect than your unskilled ones, however numerous, could be. We enter here into one of those deeply-laid and simple propositions of economy which I hope some day to work out in a symmetrical and extensive manner, hitherto unattempted even by Mill or Adam Smith. It comprehends the whole question of education and the employment of capital and industry, and will define the proper relation of *preparation and performance.* I will illustrate this by a simple instance.

"Suppose a man in early years to be so struck with the value of railways as to determine to devote his life to their construction, and suppose him to live for sixty years. Suppose him to have moderate money-means at his disposal. Should he buy a spade and a barrow, and set to work at once digging away at a railway cutting? Or would he do better to abandon for some years all care about rails, sleepers, embankments, and locomotives, and learn nothing but mathematics, mechanics, natural philosophy, reading, writing, and even French and poetry? In the first case he would remain all his life a common '*navvie*;' in the second case, favourable talents and circumstances, and what is more important, a peculiar, well-directed industry, would make him a Stephenson. Now as regards the real extension of railways, a Stephenson is as valuable as perhaps a hundred thousand navvies, for it is he that has led the whole theory and practice of railway making, in which so many hundred thousand persons are engaged in various parts of the world. This single man is probably more industrious than most, but does not labour much above the average, yet see what education, reflection, and determination can accomplish. I need not refer to other names, such as Watt and Adam Smith, to show how one man can, even in a mere mechanical sense, render himself worth millions of men, and it requires only a little more refined consideration to perceive that eminent men, in every branch of knowledge and practical life, are really as valuable as Watt, Stephenson, or Adam Smith, although they do not directly produce material wealth. Soyer is worth a hundred thousand cooks, as Newton is worth a hundred thousand ordinary mathematicians and astronomers, because by due education, reflection, and industry he leads them all into new methods, and raises their pursuit to a new level.

"You will perhaps perceive the bearing of this on your own case; if you really wish to be useful, why not desire to be as useful as a hundred thousand other people, and lay yourself out accordingly? A woman's field of action, and her available means are considerably less than those of a man, but she has no reason to complain and remain idle so long as the field is really so little occupied and still so wide, and while all her disadvantages are fully recognised and allowed for. Often,

indeed, these very disadvantages, when properly encountered, become quite the reverse, as with Ida Pfeiffer, Florence Nightingale, and many others. I am using names in illustration of what I advance, which will perhaps dismay you. Of course I do not in the least expect that you should follow in their footsteps, but that in your own chosen and natural way you should endeavour to be as confident, courageous, and patient as they. You applied yourself for a time, you say, to teaching at schools. This is a very good thing, but if you devote much time to it, aim at being as useful as a hundred thousand other teachers, by so studying the theory and practice of education that you may be an original leader in that line. But the selection of your pursuit is a duty of your own, and if you feel no present inclination one way or another, be satisfied to reflect upon and learn what will in any case be useful.

"For myself, as I have before stated, I have long felt the same desire for a useful life, but while I was at school and college it remained comparatively latent. I gave my attention chiefly to physical science, feeling much interest in it, and being sure that it could not prove useless. There is indeed almost an infinite field for work in the various branches of physical science, but within the last few years I have become convinced that more is really to be done in the scientific investigation of man.

"There are multitudes of writers of all degrees of eminence and cleverness who treat of every imaginable subject connected with man. Take for instance the number of papers contributed to the Social Science Association. But does it not strike you that just as in physical science there are general and profound principles deducible from a great number of apparent phenomena, so in treating of man or society there must also be general principles and laws which underlie all the present discussions and partial arguments? Is it not worth years of labour to dive into these inmost and obscurest principles, and after obtaining some good clue, to follow it out with all the intense pleasure of mental success into a multitude of useful conclusions? Man is said to possess *free* will, but however this be, he is at least a phenomenon in which effect is always connected with *cause*. All the inves-

tigations of social science must proceed on the assumption that there are causes to make people good and bad, happy and miserable, rich and poor, as well as strong and feeble. It follows that each individual man must be a creature of *cause and effect.* This has indeed been argued by Quetelet, but requires yet to be more completely proved. But the causes which operate in each man, letting alone a collection of men, are so very complex that their effects supply innumerable facts for many branches of knowledge. But why do these remain disconnected while the causes must have more or less connection? Men possess animal powers and functions, they have logical minds, they have a series of emotions, and they are placed in contact with definite but extremely variable external circumstances. A perfect consideration of all these data, in fact of all the causes in operation, must result in a determination of all effects; for instance in the case of a single person it must explain every trait of his character, every action of his life, every word he has spoken, every thought he has conceived. Of course such is the infinite complexity of causes and of effects that we cannot treat them in detail. A few of the main features of man and society afford plenty of occupation. To attempt to define the foundations of our knowledge of man is surely a work worth a lifetime, and one not excelled in usefulness or interest by any other.

"Why, then, should anything beyond my necessary moral obligations debar me from it? While I should never consent to sacrifice others, why should I care to sacrifice my own present ease and amusement? Why should I care for money, for fine possessions, for present name and position, or even for the real pleasures of scientific study, while there is such an important and interesting work evident to me? Others will not, for years, know or appreciate my real purposes, but it is not to be expected that they should. I do not profess to say what you should do with the long years before you; it is rather open advice to say—choose what is useful and good, and therefore likely to be happy. . . . Painting, music, and literature are indeed excellent pursuits for ladies, but they may even yet employ themselves with equal delight and propriety in branches of more serious learning, which are

not at all beyond their reach. To each individual the choice belongs, and so to yourself.

"Excuse me if my letter is extremely heavy and serious. It is suggested by your own, and while I cannot omit what I have said, I have not time to write much more on lighter subjects. A long time since I wrote about a small essay I was going to publish; perhaps you are surprised it did not appear, so I must briefly explain that the London publishers, Simpkin and Marshall, said it would not pay its cost for printing, and referred the matter back to Mr. Waugh, the Sydney publisher. I did not care to go on with it at the expense of perhaps £20 or £30 (the estimate of the total cost of 1000 copies being £87), but I did not see the least ground for discouragement, as it is not at all usual for original essays, by unknown writers, on dry uninviting subjects, to pay any profit. I am even glad now that it was not published, as in years to come I can make use of the same conclusions, free from a great many faults of style and mistakes, which I expect exist at present in the essay."

To his cousin Henry Roscoe.

January 1859.

". . . I feel an utter distaste for money-making, but on the contrary ever become more devoted to my favourite subjects of study. Perhaps you think I am too varied and desultory in my employments, which is partly true, but you know I am yet in a transition state. I told you, long since, that I intended exchanging the physical for the moral and logical sciences, in which my *forte* will really be found to lie. I like and respect most of the physical sciences well enough, but they never really had my affections. I should be glad, indeed, to follow out my subject of the clouds and the movements of the atmosphere, because I feel sure I could place it in a new position altogether; perhaps I may spare time for this in England, but I shall make it a secondary thing. I have almost determined to spend a year at college before looking out for any employment in England. It might be worth while to take my B.A. (If I had had this degree before coming to this colony I should vastly have improved my position in, as well as outside, the

mint.) I wish especially to become a good mathematician, without which nothing, I am convinced, can be thoroughly done. Most of my theories proceed upon a kind of mathematical basis, but I exceedingly regret being unable to follow them out beyond general arguments. I daresay it is the general opinion of my friends in England that I am inexcusably imprudent in resigning £630 per annum. . . . But, I ask, is everything to be swamped with gold? Because I have a surety of an easy well-paid post here, am I to sacrifice everything that I really desire, and that will, I think, prove a really useful way of spending life?"

To his sister Lucy.

DOUBLE BAY, *February* 1859.

". . . It almost seems now as if my return to England were a reality very soon to happen, and it does not seem at all out of place to consider what must be done when it is accomplished. To build castles or even very moderate-sized houses in the air is absurd, but this is not the case with us.

"You suggest very reasonably that it will be necessary for me to do something to earn a living in England, and that I ought not to be without settled plans. It is a fact which I do not mind confessing to yourself, that I wait very much 'for something to turn up,' but I am pretty sure I can find some way of supporting myself, and perhaps others, which will not interfere with my own settled pursuits. . . . A preliminary, however, upon which I have almost decided is that of taking my B.A., not so much for the value of the title as for the sake of a little more study. . . .

"Herbert's letter from Wayzata is cheerful, and so far satisfactory. . . . I shall certainly try to reach his abode and see him. Travelling in the United States is, I believe, cheap, easy, and rapid, so that if I ever get into the country it will not be difficult. . . . Vessels to the west coast of America are now very scarce here. I shall have to take any that offers, whether it be Callao, Valparaiso, or San Francisco, but I understand there is such good steam communication along the coast that it does not much matter. I shall cross at Panama (where a letter might perhaps reach me), and enter the U. S. by one way or the other. I have

no fancy for New Orleans and the yellow fever, but I should like to ascend the great Mississippi, the head of the navigation of which is, I believe, St. Paul's, of which Herbert speaks.

"I will now tell you that I have only just returned from a rough, hard-working, but fine excursion to the southern diggings. With the exception of the passage by the steamer, I walked all the way there and back, and to many places in the neighbourhood. I lived in a tent with Charles Bolton, Maurice O'Connell, and their mate, Frank Fuller, and saw and felt all the peculiarities of life in the diggings. My principal employment was photographing with my stereoscopic camera and tent, and my success exceeded all previous efforts, which, however, is not saying very much. I have about twenty pictures, many of which are almost professionally perfect, exhibiting not only general scenery, but all the principal operations of gold-digging and washing and incidents of tent life. The diggers were highly amused at being taken, and only required a hint to stand in any desirable attitude, so that my pictures seem almost alive with real diggers. I even got an aboriginal black with two black *gins* or wives, who sat still in the sun while I made four or five attempts at their portraits before I succeeded. . . . When out in the field I am quite pestered with people wishing to buy views, and if I carried printing materials with me I might easily travel scot free as an itinerant photographer. It is one disagreeable thing in this country that a tourist is always mistaken for some sort of a tramp, because they are utterly unaccustomed to the tourist system, so highly developed at Snowdon, the Lakes, Mont Blanc, etc. However, it is pleasant to travel in places really primitive and unappreciated. I walked to the Valley of Araluen, a long narrow valley so entirely surrounded by steep mountain ranges that wheeled carriages of all sorts can neither get in nor out. Provisions are taken down the mountains on sledges. The place is occupied by none but gold-diggers and their dependent trades. A drawback to travelling there is that decent accommodation cannot be had. I had to beg and pray the only respectable landlady there before she would give me a bed in a loft. The valley,

however, was highly picturesque, and the foliage of the trees along the sides of the creeks was delightful, at all events to an Australian eye. Here were fine large Casuarina trees, called swamp oaks, with a dark green foliage resembling the pine or fir of England, only more graceful. The shady natural groups of these trees were beautiful among the variety of fine old gum-trees to which we are here so much accustomed. The comprehensive view of the valley from the top of the mountains, with the distant wild ranges which hedge it in on all sides, was surpassingly beautiful. I made a desperate attempt to photograph it, with just a particle of success, but distant mountains as well as clouds are practically beyond the power of the photographer. The country surrounding the diggings of Janbecumberre, where I lived, was unlike other Australian country, being an unvaried wide and slightly undulating plain or tableland, entirely covered with fine green grass and shaded by fine scattered trees. It exactly resembled, in short, an unlimited English park. There were plenty of birds, including crows or ravens, magpies, many white cockatoos, and I also saw two magnificent black and scarlet cockatoos. Of course one apprehended the drawbacks of snakes and herds of wild cattle, the latter especially alarming to the timid, but being in fact very timid themselves."

To his sister Lucy.

BEECHWORTH, OVENS DIGGINGS, VICTORIA,
Sunday Evening, 13th March 1859.

"It is a pleasure to be able in the midst of my travels to spend a quiet hour in writing what you will soon read, and you will be glad to hear that I am as yet safe, well, and pleased with the strange and various scenes of life and nature which I meet.

"I had set my heart on performing the overland journey to Melbourne, although knowing it to be exceedingly laborious, expensive, in most respects uninviting, and not altogether unsurrounded by dangers. As steam communication with Melbourne is so convenient and rapid, it is an unknown thing to go overland, except when there is necessary business on the road. I wished to gain a fair idea of what the interior of Australia is, although it be somewhat repul-

sive, and I had the further advantage of seeing two considerable gold diggings—viz., the quartz reef at Adelong, and the celebrated *Ovens District.* A journey of 600 miles overland is but a slight affair in a first-class railway carriage, but on a small mail cart, dragged by force of numerous horses over the uneven tracks and among the bush of Australia, it is really no matter of joke. The mail carts travel *day and night* at the rate of from 4 to 6 or 7 miles an hour, and during the whole twenty-four hours, awake or half asleep, you must hold on hard, lest an unexpected jerk should set you flying.

"I do not mind admitting that I have scarcely met with a scene of beauty the whole distance. An eye accustomed, as mine now is, to the unvaried greenish brown or black of the distant bushy country, to the common shape of the mountain ranges, and to the foliage and other component parts of the foreground, is not again excited by similar scenes, although hundreds of miles away. The difference, too, of the coast and interior country is all against the latter in an artistic view. The varied scrub, forest, and flowers of Sydney, and the magnificent tropical vegetation of Illawarra and the coast ranges, are exchanged for a thin scattering of gum-trees and a partial covering of dry and straggling grass. The landscape is often like that of an ill-kept English park, but devoid of its variety, its interesting associations, the beauty of the tints and the noble roundness of English forest trees. The interior country of Australia may be classed into several kinds, over which you pass uneasily in dreary succession. The mountains are chiefly in the form of long ranges, with steep stony sides, but always covered with more or less gum-trees. In one place the trees upon some hills were so thinly scattered as to look perfectly ridiculous, indeed, like those in a Chinese painting. Again, at the foot of the ranges, generally occurs a large extent of undulating slopes, over which you travel roughly, with the sight of nothing but trees, grass and banks of sterile earth or coarse clay. Thirdly, there are alluvial lands, or *flats*, as they are called, of rather more productive soil, but still a dull expanse, over which you are glad to pass at full gallop, swallowing, as you cannot help, your fair share of the

dusty cloud which envelops the coach. The only places which are devoid of trees in Australia are what they call plains; these are level lands or gentle hills perfectly and naturally free from trees, and bearing only a carpet of grass, which is generally so dry and burnt by the sun as to appear yellow like hay. The Goulburn plains extend some 20 or 30 miles, and this yellow expanse, bordered by dark brown bushy ranges, has a very remarkable appearance. On one end of these plains the town of Goulburn is laid out, not unprettily, as seen from a distance, but when inside it about noon the unshaded glare of the sunshine, and the abundance of white dust, are nearly insupportable. The town of Yass, again, is built on somewhat similar plains, but of less extent; here too is a river of decent pretensions, fringed with graceful trees; around are several remarkable mountains, while in the extreme distance is seen the gigantic and rugged range of the Australian Alps, the highest in Australia, but still not exceeding about 7500 feet, or half the height of Mount Blanc. The remarkable interior rivers, Murrumbidgee and Murray, great rivers as they are here called, have a very serpentine course between flat lands liable to inundation, but covered by clumps of trees are very picturesque.

"The uneasiness and danger of the mountain roads of N. S. W. are now past, however, and I am in Victoria, and in the midst of one of those remarkable gold districts which are a new wonder of the world. Such a comfortless, unsightly but interesting place could not be found elsewhere. The greater part of this morning I passed in the Chinese camps here. They are collections of many hundred tents arranged close together in the form of rectangular streets. In the construction of these tents, canvas, split wood, old packing-cases, old tin, old clothes, old sacking, etc., are indiscriminately employed for the simple purpose of keeping out the sun and wind. You may imagine, then, how squalid and unsightly are a few hundred such tents, inhabited by swarms of the little ugly Mongolians, in their loose blue clothes, and often with their extraordinary basket hats. Often also you see them carrying water or transporting their earthly possessions in their own peculiar manner over their shoulders.

In the centre streets of the camps are all manner of canvas shops, and a number of *temples*. They let me freely walk all round and examine the latter, which were the only places of worship I had entered for a long time. The god himself was *shin* or *chin*, as they emphatically told me in answer to every question, and this god seemed to exist somewhere among an extraordinary collection of gimcracks, of pieces of drapery covered with Chinese characters, and probably close in the neighbourhood of a lamp which was burning. I also saw the old Chinese man prepare tea for this god: it was uncommonly weak, and offered in three teacups and three or four old eggcups. It was accompanied also by the burning of small sticks of incense and the beating of a drum and gong. In the shops I bought for you a Chinese fan, which fans very well, although it is decidedly ugly. For Henny I got a Chinese book, and Tommy may have the change in Chinese money. I greatly amused a little Chinaman who met me when seriously studying the volume, which I assured him I understood. The last 30 miles were travelled in company with a little Chinaman who was brought up in Glasgow and well educated; he dresses in the full style of a gentleman, and has the official title of interpreter and protector of Chinese for this district; still, he is all affability and condescension.

"I should mention that in travelling the most solitary, flat, and tiresome part of the road, a distance of 120 miles, we came, among the dry grass and gum-trees, to a station called Kyeamba, where vines and fruit-trees grew luxuriantly. The proprietor, a funny old man named Smith, wanting a favour of the mail driver, took him, as well as myself and fellow-passenger, down into his vaults, where he stores his own made wines, and treated us to three or four kinds. They were light sweetish wines, but after a dry hot journey inexpressibly delicious and refreshingly cool. I drank two tumblersful, and yet preserved my right senses, and thought Kyeamba a true oasis in the Australian desert, where nothing better than water was to be found. For the present, however, good-bye, for I have booked my place for Melbourne, and start to-morrow at 5 A.M., consequently I must go to bed early."

EMERALD HILL, MELBOURNE,
16th March 1859.

"Since finishing the above account, the succession of dreary stages of monotonous objects and of tiresome delays and disappointments, has been exchanged for everything pleasing and convenient, and the rest of my letter will perhaps be a chapter of good luck. In travelling from the Ovens to Melbourne, a distance of 166 miles, we had curious but comfortable coaches drawn by four horses. The passengers were respectable and not disagreeable, and as companion I had a gold assayer, who chanced to be travelling from the Adelong gold-fields, where he had been with much the same object as myself, and whom I find to be very respectable. As we got towards Melbourne the roads improved, and the fresh coaches to which we changed were even more commodious. . . . At distances of 10 or 20 miles we came to pleasant little towns with romantic-sounding names, such as Avenal, Violet Town, Seymour, Glen Rowan, Donnybrook, or peculiar native names, as Tarrawingee, Wangaratta. The country, however, was even more monotonous than anything I had passed before, in fact, one continued flat and lightly-wooded plain, intersected by several considerable river streams, and numerous devious creeks. Having left Beechworth at 5 A.M., we met with evident signs of the proximity of Melbourne at daybreak the next morning, and at eight o'clock found ourselves, covered as we were with a frightful accumulation of dust, in the busy streets of this great town. As yet I am charmed with Melbourne. It is totally unlike Sydney, and artificially as much greater as it is by the nature of its site worse than it. Built upon an expanse of land as nearly flat as can well be, nothing picturesque can be expected, but the fine straight regular streets, filled with handsome buildings and stored with every luxury, are the next best thing. But what chiefly charmed me was that on the very morning of my arrival I saw an announcement, by the Melbourne Philharmonic Society, of the oratorio *Israel* for the evening. I instantly bought a ticket. I have often longed for an oratorio, but did not expect such a thing on this side of the world; moreover, with one exception, the *Mount of Olives*, there is

no piece of music I more wished to hear than *Israel.* You will perhaps be surprised to learn that such a great and difficult mass of double choruses was very well performed here. The solo singers, indeed, were wretched, and the instruments were few and played with want of taste; but there was a good organ, and, what is more, the two choruses, making together some 120 or 130 people, sang with at least as much force and feeling as a similar number would in Exeter Hall. I found almost everything realised that I had expected of the *Israel.*

"But I must spend what time I have in telling you of my progress here. Arriving at 8 A.M. from a journey of twenty-four hours, I had, before going to bed, not only heard an oratorio, but done the chief part of my business. I visited Mr. Hodgson, an assayer here, and a pleasant little gentleman of my acquaintance in Sydney. Mr. H. took me round and showed me all the banks and assaying establishments; and when I asked his advice about means of living here, his chief assistant, a pleasant obliging man, said he had some rooms vacant in his cottage. . . . I am well pleased with my lodgings, and I daresay I could stay with comfort longer than I at all intend to do. I shall be able to arrange my photographic things here with convenience, but there is a complete want of subject, for the view before the windows is a flat plain half covered with water, and a few short trees in the distance, said to be the Botanical Gardens.

"I may perhaps compare Melbourne to Birkenhead. On entering it from the land side there are precisely the same wide well-formed streets, fine buildings, almost too large for their purposes, and preparations for all manner of parks and improvements. Then, on the other side, there is the same abundance of shipping, a forest of masts such as one sees at Liverpool, and there are railway trains with passengers and goods busily running in and out of town. Emerald Hill, where I am, is a quiet suburb 1½ mile from Melbourne, but not far from Sandridge, *i.e.* Hobson's Bay, the port. It is called a hill, but I have hardly been able to detect any elevation above the general level of the plain.

"I shall have much more to see in Melbourne, and to select a ship in which to leave Australia, then I shall spend at

least two weeks in visiting the great gold fields of Bendigo, Ballarat, etc., which can be reached by coach in six hours. I shall not sail, then, probably under four weeks. More particulars I cannot give. As of course I no longer hear from you, I have not much to remark about home affairs, but it is needless to say how continually I have you and an English home in my thoughts."

To his sister Lucy.

EMERALD HILL, *9th April* 1859.

". . . I am glad to say that my Australian travels are now achieved, and that I have safely returned from a rapid but satisfactory circuit of the Victorian diggings. They are almost entirely devoid of any picturesqueness, but such celebrated places as Ballarat and Bendigo are surrounded with extreme interest in both a scientific and social aspect. You can form no idea as to what strange scenes of life you meet. Thousands of very sturdy independent diggers raising daily from a wilderness of clay and gravel the much-sought gold, and rapidly adopting fixed habits, manners, and appearance. The digger dresses better than an English labourer, and generally in dark-coloured woollen clothes, discovering slight traces of the earth in which he works. He wears a straw or wide-awake hat, beneath which is a face rather stern and dark, and gravely bearded. You may always expect from him a rough, and rather familiar, but spontaneous civility, simply because from his independence of you, and little care for your superior position, he can easily afford it. Thousands of such men live in tents either with their families or with their 'mates,' that is, partners. In the latter case it is often amusing to see a big man going a round of marketing and carrying home chops, steaks, loaves, or perhaps a bundle of carrots. Again, there are the swarms of Chinese always pursuing a quiet kind of industry, and just alloying their own fixed habits with a tinge of the civilisation around them.

"But the diggers only form a part of the population of the diggings, for gold that is raised must be spent, and whole townsful of greedy dealers collect together, offering the digger every kind of article which can draw from him his gold, but often giving in return, it must be said, the best products of

other labour. . . . I stayed six days at Ballarat, of which I will only further say, that it was a very singular town wit a first-rate hotel, where I lodged comfortably, but rather cheaply. I took some photographs, but no very good ones. There was an unlimited number of subjects in the peculiar style of life there existing, but I soon found it too laborious, time-consuming, and annoying a work, and despatched my apparatus back to Melbourne. Then I went by coach through Cresswick's Creek and Clunes (both alluvial or quartz reef diggings), to what is called the 'New Rush Back Creek.' Here some 30,000 diggers had literally rushed together in the space of a month or six weeks in consequence of rich new discoveries of gold just made. To describe the appearance of the mushroom town of canvas thus suddenly created among the ancient (and we may poetically imagine) terror-stricken gum-trees, would be impossible in a moderate-sized letter. There were full two miles of regular canvas streets, densely set with every kind of shop. There were five banks, of which one had offices in a draper's shop, while others, for instance the Great Oriental Bank, had small wooden or iron houses, of two or four rooms. There were photographers, doctors, dentists, lawyers, apothecaries, bankers, watchmakers, laundresses, libraries, in addition to every common kind of trade. I have an advertising newspaper published in the place within the few first weeks of its existence. You will perhaps not be pleased if I say too much of the grog shops, billiard-rooms, concert halls, and other questionable places of amusement, which perfectly abounded.

"But I had no fancy to remain in the place, which even old stagers declared to be the most disagreeable hole on earth. Accordingly I went on to Maryborough, another old diggings, then, next day to Tarrengower, which is on a small mountain. Here I was excellently received by a gentleman I met on my overland journey, and he showed me the quartz mines, etc., into which we descended by perpendicular ladders, much to the benefit of my nerves.

"After two days at Tarrengower, on to Castlemaine, a very pretty, clean, and model little town, which, with Forest Creek where the diggings are, forms a fine panoramic picture. Next day, again, to the celebrated Bendigo, and after another

night home to Melbourne. Travelling here as elsewhere is full of amusing, but not at the time always agreeable, incidents, which will afford substance for much pleasant reminiscence.

"Victoria is in the parts I have seen utterly unpicturesque, and little different from a wide poorly-wooded plain. I even now regret the deep dark gullies, the bold rocks, and the luxuriance of bush which New South Wales can certainly boast.

"I may now state that on again reaching Melbourne I found a ship was almost immediately to sail for Callao, where my chosen route lay. On examining the ship I found her a sound, large, new one from Glasgow, rather dirty, but roomy, and as safe as any land. Accordingly I at once paid the passage money (£30), and have hurriedly provided myself with ship's bedding and a table, chair, etc., for berth. She was to have sailed to-day, but I am glad to find it will be Tuesday or Wednesday before she goes, and I have thus some time to spare for letter writing. This afternoon I called at the Melbourne Observatory upon the director, Professor Neumayer, a rather new-comer. I was introduced to a little spare German, who received me with a tremendous bow, to which I was obliged to respond with interest. . . . With the greatest enthusiasm he at once commenced a complete round of his observatory, showing and discussing with me every instrument, meteorological, magnetic, and astronomical, of which at least the two former kinds, he had a numerous and very varied collection, all in active use throughout the twenty-four hours. Then he showed me many of the numerical results, explaining the methods of reducing them, and carefully taking my direction and name that he might post me his published reports, and even promising immediately to set his assistants to work to copy out a few barometer readings which I required, and had made the ostensible purpose of my visit. . . . How delightful it is to meet this enthusiasm for true and highly useful things, when one passes whole years together among those who are enthusiastic and greedy only about gold. One would be willingly snubbed each day of the year by the rich and addleheaded, if only received so well as this by the truly best of their race.

". . . I have lately formed an idea of collecting specimens of newspapers from all parts of the world, only a single copy, or at the most two, of each, being admitted; I think that when I have got a good many they will be exceedingly interesting and useful, as presenting a peculiar insight to public and private matters of all people. A great part of the collection may be made without expense by getting old copies thrown away. I have already got nearly thirty Australian ones, of which some are curious, especially the *Back Creek Advertiser*, published at the New Rush. In America I shall meet with a multitude of papers—the date does not much matter, but should not perhaps be older than 1850, unless for papers which have ceased before that date."

To his sister Lucy.

SHIP "CHRYSOLITE,"
Latitude 19° 37′ South; Longitude 83·33° West.
600 Miles S. W. of LIMA, S. AMERICA,
29th May 1859.

". . . I commence my letter anew, because my previous attempt was in such a solemn heavy style that I could not get far on with it, and even if I could have completed a few sheets in the same style, I should have dreaded their effect upon your general health and spirits. I believe I am blessed with what may be exactly described as a well-regulated mind, in which grave and gay are not incompatible; whose whole attention may for a time be given to any one subject or reflection without becoming so preoccupied that other things are inadmissible. . . .

"But you will wonder, perhaps, that I am in a ship and say nothing about the voyage. How I wish you could be here with me for a few hours, that you might go with me and look over the stern rail into the exquisite deep blue of the ocean water—a colour which seems to me in itself in the highest degree sublime, since it is the indication of perfect purity, of unfathomable depth and of almost infinite quantity of water. And then you would never be tired of looking round the visible horizon, although it is but a straight line every day, with an apparent dome-like sky above, and a plain-like expanse of heaving dark water below. By looking

on the map for Port Phillip and Lima, or Callao (the port), in South America, you will see that the voyage between them lies across the greatest and most uninterrupted space of ocean which this globe possesses, and we passed certainly not far from the point where you are in the utmost possible degree remote from solid land. Add to this, that it is a part seldom traversed by any ships, and almost deserted by all living animals, and you would imagine the voyage to be gloomy and overpoweringly monotonous. But to me at least it has not seemed so.

"Fortunately, as there was abundant room in the cabin, I obtained a berth all to myself, and I took care to furnish it with two little cheap tables in addition to other necessaries. With the aid of my closely-packed portmanteau, box, and bags, I find myself surrounded with books, instruments, and every little thing that I can want. The only unpleasantness is that I cannot do half what I wished and intended—books must remain unread, many things unwritten, and many experiments and observations untried. I have, however, got a good deal done of my journal or accounts of my tour in Australia, having written, since I came on board, almost 170 large and closely-lined pages, illustrated with innumerable sketches or other figures of the most rough execution. I have as yet, too, deferred the general description of the diggings and of the modes of extracting gold, which might make another 100 pages. But I can assure you I will never require yourself or any one else to read it, nor do I myself venture to read what I have once written. Perhaps it may amuse me if ever I am an old man, and look back to the strange early days in Australia, when I was living in tents, sleeping in the air, exploring unknown and romantic mountain scenery, or jolting on the royal mail through bushy deserts at most dark and unearthly hours. Already I begin to regret Australia, and when I am holding yarns with the captain about it, I feel a slight tendency of water to the eyes, and an inclination to give most partial and 'rose-coloured' descriptions.

"We are a very small, if not a very affectionate, party in the cabin here. The captain and I are perhaps the best friends aboard. The *Chrysolite* is from the Clyde, and he is

consequently Scotch. I keep the Board of Trade meteorological log for him, and discuss or try various nautical observations. . . . I spend most of my day either writing in my berth or reading. To-morrow, however, I must begin to arrange and repack my boxes, as in three days we may possibly be in Callao. Winds, however, as I am fully convinced, are most contrary and capricious phenomena, and in spite of the many fine philosophers who write grandiloquently (in a quiet parlour with their feet on an English fender) about universal and inscrutable laws, proving the benevolence and wisdom, etc., the winds which we have had might certainly be said to drive a coach and four through the most solemn and important laws and decrees of meteorologists. We repaired to high southern latitudes that we might benefit by the constant westerly winds which *always blow there*, but presently met a strong stormy east gale blowing right ahead of us, and delaying the voyage twelve or fourteen days. Now we are in the *trade winds*, which ought to be steady delightful breezes, but we find them to consist of heavy shifting squalls."

"*2nd June*, 20 *miles south of Callao.*—This is one of those most cheerful days which occur in the lives of but few people, and then only at rare intervals—the first day in sight of a new continent after a long sea voyage. All day we have been lying becalmed 20 or 30 miles from the shore of Peru, and almost in sight of our port; but although this delay is provoking, it is not unpleasant to me. The coast is almost unequalled for boldness and grandeur, but is unfortunately shrouded for the most part in dense beds of cloud. The sky is gloomily clouded, and all around the atmosphere seems in a thick and hazy state. Yet below the layer of clouds peaked rocks or lofty precipices are seen rising from the water's edge, and above these are a confused multitude of mountain slopes, which seem to melt away into each other with that exquisite delicacy of outline and of tint which form the charm of distant mountain scenery. It was for a long time left to our imagination to trace the shapes and heights of the higher peaks, until for a short time we gained sight of an immense mass of mountains or tableland, probably that of *Pasco*, towering above the clouds, but scarcely distinguish-

able from them. The elevation of the loftiest summits, seen from here, does not exceed perhaps 12,000 feet, while Mont Blanc is nearly 16,000 feet in height. But then the *Andes* are a range of extreme length, and of immense proportion in every part. They are also situated close to the coast, so that the impression of loftiness must be all the stronger.

"But we have had other novelties to-day to break the monotony of our monotonous voyage, for a whale was reported. I had never previously been so fortunate as to see the greatest of animals, and considered my chance quite gone; but here he was blowing away, that is, spouting out water just as the story-books describe him. We have also seen during the morning numbers of *pelicans*, great birds with large bills a foot or two in length, who coolly sit in the sea-water looking out for fish. For the last few days we have also seen numerous *booby birds*, who live on solitary rocks and islands, and also occupy themselves in fishing. Perhaps you have heard of Cape pigeons, who bear the sailor company in many a solitary voyage, but you can scarcely imagine what beautiful little birds they are, with white breasts, black heads and wings, most prettily diversified with black and white feathers; their shape is the plump yet elegant one of the pigeon or dove, and they can sit and swim in the water, which they do especially on a calm day, and they then look even prettier than when circling about, with their wings outspread and motionless, in the air. From ten to a hundred usually follow a ship day and night."

MARINE HOTEL, CALLAO,
9th June.

"I have now been a week in Peru, and am already anxious to leave it—not that there is any want of interesting objects, but because everything and everybody is strange and unpleasing. Perhaps you have never before heard of Lima, the capital city of Peru, which is an old Spanish colony celebrated for its silver mines; yet it is a most remarkable place, and I have seen more novel sights in the last week than in any equal period of my travels. For instance, you will perhaps be shocked to hear that last Sunday afternoon I witnessed a true Spanish bull-fight in its full barbarity. Imagine a large

rudely-constructed circus, open to the air of this delightful climate, where rain or storm is positively unknown except as a prodigy. It is overlooked by a bare lofty rock—the Sierra di San Cristobel, which bears a cross upon its summit. . . . Two or three thousand of the Peruvian people are collected on its benches, while the richer and the fairer in complexion chiefly fill the highest range of galleries or the low series of sheltered boxes which enables them to be close to the wounded bull as he rushes round the circus and near him when he dies. The people are of all varieties, from Englishman or Yankee to negroes of unusual blackness and ugliness, but the dull dark faces of the native Indians are perhaps the most common."

STEAMSHIP "MEDWAY," 29*th June.*

"I must leave my description of a bull-fight for another time. . . . You must excuse this fragmentary, clumsy letter, but I find my faculty of writing almost deserts me amid the exciting or interesting scenes which I should wish to describe. . . . In my letter to Henny (of the 21st June) I have answered her small epistle, so happily received at Panama, and have given some account of progress since leaving Callao. . . . "Curiously enough, I find in my desk some old English postage stamps which I have had since (on *this day five years*) I left home; now they serve to bear this letter which tells you how near I am to England."

To his sister Henrietta.

ASPINWALL HOTEL, PANAMA,
21*st June* 1859.

"Some writer has said that a traveller's life is full of intense pleasures and intense disgust. This day seemed likely at first to be one chiefly of vexation and trouble, although indeed this strange little town excited in me no little interest. But when, in company with two fellow-passengers, I happened to pass a vacant-looking old building which serves as a post office, it occurred to me to enter, more with a view of finding something to do than because I had a faint recollection of once telling you to address a letter to me here. A board was pointed out in reply to my inquiry, covered over with slips

of paper, variously aged and dilapidated, all written over with names in a nearly illegible and careless handwriting. All hope of success in my search vanished as I glanced over a few of these lists with their strange mixture of Spanish and English names—José, Pedro, Pablo, Antonio, Isidore, alongside of William, Henry, Thomas, John. But just escaping the edge of a mischievous tear, what do I see? my own name legibly, unmistakably written down, nay even correctly spelt to the last letter—this latter being an occurrence almost unprecedented during my lengthened experience among strangers. It was with a rare delight indeed that I received your little letter. . . . I hope to be at home in about three months, when it will indeed be pleasant to have a week's quiet life with my sisters, and it will then be time to discuss every plan; much there will be to discuss in so short a few days, for if I join the university again it will be necessary to settle to my study rather quickly.

"My more immediate business now is to request you to write as quickly as possible, and give me intelligence of Herbert, whom I wish to visit before I return to England. Tell me if he is in the same place as according to the last account (Wayzata). The journey will be a rather long one of a few thousand miles, but will be easily performed with the aid of American facilities."

STEAMSHIP "MEDWAY," CARRIBEAN SEA,
29th June.

"Being unable to obtain a steamer from Panama to the United States without waiting nearly a week at the hot fever-breeding Isthmus, I determined to come on in this steamer, and with my previous fellow-travellers, as far as the Island of St. Thomas, West Indies, which, being a great port, will afford me a choice of routes to the States. We are within a day's sailing of St. Thomas, where, of course, I shall post this letter onwards. It will be tantalising to think that I am within fifteen or sixteen days of England, and see others proceed onward to that happy land, yet not to join them myself. But of course I must not be impatient and break off from my intended travels. At St. Thomas I shall either take a sailing ship direct to New York, or shall take the Havanna

steamer which touches at six or seven of the intermediate West Indian ports. I am now rather overrunning my time, and shall not leave sufficient for the wonders of the States.

"You will perhaps like to hear a little about the places I have lately seen. Callao, where I first landed on the American continent, is a seaport of some consequence, six miles inland of which is the celebrated city of Lima (pronounced Leemā), the capital of Peru. I lived in a curious French hotel in the town of Callao for nine days, going up to Lima, when I desired, by means of the railway, which now connects them. The buildings there are quite unlike anything I had elsewhere seen, being built partly of sun-dried bricks, partly of laths and clay, for the climate is so dry and *rainless*, and the occasional earthquakes so severe, that this mode of construction is the most suitable. The houses are usually of one storey, and enclosed, according to the Spanish fashion, with an outer wall or range of buildings through which a gateway leads into the *patio* or courtyard. The most extraordinary love of ornament and of bright colours is shown by the people here, for they not only paint all the walls and houses of pink, sky-blue, light yellow, or other brilliant and pretty tints, but they also leave no vacant space without a fresco painting of some curious allegorical design, or of some landscape real or fanciful. The courtyards often contain fountains and small groves of potted plants and trees, so that the Lima houses, although very different from what the more substantial and reserved taste of the English would prefer, are often extremely elegant, and well adapted to the circumstances of the city. But the churches (of which there are sixty-seven) and the large old monasteries attached to many of them are the great points of interest in the place. The Roman Catholic religion, imported from Spain here, gained vast power, wealth, and extension among a population formed to a great extent of native Indians, low in the scale of intelligence, and of negroes who are worse. As a consequence the religion became debased into something which I can only regard as a bad form of idolatry. The churches are remarkable in an architectural point of view for an extreme and absurd abundance of ornament and colours, but the altars inside, before which the people

worship, are what excite and disgust one most. They consist of large complicated erections, gilded and profusely covered with carving in every part. Often they are loaded with large quantities of pure silver, in the form of candlesticks and of ornaments of senseless and indescribable form. When silver was not to be had the commonest tinsel was substituted. The eyes are indeed attracted and dazzled by this tawdry and barbarous pile of decorations, but they rest with disgust upon the images which are placed in the niches and peep out from every side; the Virgin Mary with a gilded crown and a dress of bright yellow silk, embroidered with a mass of gold or tinsel lace; Christ himself represented by a barbarous wooden figure nearly naked, and showing wounds and streams of blood; and the Apostles clothed in robes of velvet, with the usual profuse and tawdry decorations. Such are the objects before which crowds of women, white, brown, or black in complexion, and even men, may be seen kneeling and praying at all hours of the day, while other women are murmuring their confessions to old priests who sit easily in the confessional boxes. But it would be impossible to give you a complete idea of the curious general aspect of these old Roman Catholic edifices, the gloomy vaulted naves, the ghastly images, the old and rude pictures, which startle you at every step, the antiquated organs, the great screens of double iron bars which separate off the chapel in which the nuns or monks attend the service. In the monasteries, again, you may roam through courtyard after courtyard, along gloomy long passages, and up great staircases, passing, every now and then, a small chapel enclosed by a lattice door, within which a solitary lamp burns before the tarnished old altar and its images, in evidence that it is not quite neglected. All these strange edifices, built of vast masses of sun-dried bricks, and tried by many an earthquake, have the evidences of decay, and one is almost glad to see that the tarnished altar-piece is not regilded, and the fallen image often not replaced. Where might one see idolatry if not in Lima? Who would be a Christian if this is Christianity? But I must tell you more about these things when I see you.

"Leaving Callao by the Pacific Steam Navigation Com-

pany's steamer, we passed up the coast, stopping at three ports, and on the tenth day we landed in Panama. This is a curious old Spanish town of small size, but beautifully situated. Its inhabitants are chiefly negro, with a mixture of Indian blood; but the splendid churches and religious erections of the former Spanish colonists have now nearly passed away, for their ruins, overgrown with bushes, now encumber the town, and of a total number of seven or eight, only the cathedral and one or two more can be used for worship. I remained here two days in a good French hotel, then at 9 A.M. of the next day I started on the celebrated Panama railway, and in passing the Isthmus saw for the first time a tropical country of which every square yard is covered, nay, piled up, with a bright green luxuriance of vegetation in a multiplicity of elegant forms.

"It took four hours to travel the distance of 47½ miles across the land (the cost for fare and luggage being 43 dollars, or nearly £8 : 12s.), and we then went straight on board the *Medway* steamer, as Aspinwall, the railway station and port on this side, is a miserably hot and unhealthy place. Since leaving there we have touched in at Carthagena, a Spanish seaport town of considerable beauty and interest, but we did not go ashore. Here a number of native Indians came off in their canoes and sold to the passengers many monkeys, parrots, marmosets, as well as shells, sponges, fruits, and other natural productions of this tropical place. The *Medway* is a steamer of considerable size, but old and extremely uncomfortable. The weather is intolerably hot and close in these tropical seas, as the thermometer never falls below 80°, so that travelling here is far from being a pure delight, and I now look forward to a quiet sooty room in London as very happiness itself.

"It has rendered my journeys much more pleasant of late that I have been very fortunate in my travelling companions. From Melbourne I have been with old Dr. Fergusson, an inspector-general in the English army, a very high rank, as he occasionally tells us. He is sometimes a great bore, being deaf and infirm, but he is a most plucky and excellent old man, so that I am glad to help and cheer him occasionally. He even went up a church steeple with

me in Lima. Then at Callao we took on board several very intelligent and agreeable English gentlemen who have been a long time in Peru, and whose conversation is interesting and rational to an unusual extent. Lastly, there is Dr. Karl Scherzer, the chief scientific traveller belonging to the *Novara* Austrian frigate, which has recently made a voyage round the world, and was for five weeks in Port Jackson. The doctor is an author and traveller of considerable German reputation, has spent twenty years in visiting nearly every part of the world, knows almost every man of eminence, speaks six languages, has the rank of lieut.-colonel in the Austrian army, yet he is totally unassuming, and when not engaged in writing, spends the whole day in the most delightful conversation. Of course I am the best friends with him, and, either on scientific or political subjects, have much discussion at every spare hour of the day. Here every hour of the day is to spare. . . .

"I can well remember how on this day five years ago I parted from you and Lucy, and also from my father. I have very often thought of the day with a feeling that was not far different from downright pain. Soon it might be buried and forgotten were it not that it was my father's last farewell. . . . But in about three months we will hope for a day as joyful as that was full of pain."

HOTEL DE COMMERCE, ST. THOMAS,
30th June.

"I am again on land in a pretty seaside town with a very high temperature. But I must first think of posting my letters, then of breakfast."

Soon after his arrival in England Mr. Jevons wrote a long account of his journey to his friend Mr. Miller of Sydney. In it he speaks of St. Thomas as "a pretty little tropical island, with a curious little Danish town spread around the shore of the harbour, surrounded by steep green hills rising almost from the water's edge." He continues:—

"The only vessel direct for the States was a small Yankee bark. I preferred to take a Spanish steamer which in two days was to leave for Cuba. Ten days (I think) were spent in this most delightful voyage, the weather,

glorious yet fiercely hot both day and night, being now delightful when every suitable comfort was afforded us; the day spent on the well-shaded deck reading or watching the beautiful green islands as they came in sight or faded in the distance, sleeping at night upon a bed that was nothing but open cane work and a single sheet, enjoying fully the Spanish style of living—viz., breakfast at ten with numberless dishes of meat and fish, flavoured highly with garlic, and succeeded by a fine dessert, nothing to drink but an abundance of claret, a similar meal for dinner at 4 P.M., iced lemonade at noon, and coffee at night. You may well believe, then, that this was a charming voyage. There were numbers of Spanish on board, who are, outwardly, polite agreeable people. My only English companion was Mr. Stewart, a Demerara sugar planter, who accompanied me to Baltimore in the States. . . . We stayed for some hours at the Spanish town and island of Porto Rico, again for some hours at a port in St. Domingo. Thence we steamed for the port of St. Jago de Cuba, in the town of which I spent a day; we also touched at two less important places on the north coast of Cuba, and at last entered the striking and much-praised harbour of Havanna.

"I shall never forget my visit to this port and town; my determination to take everything with as perfect coolness as the tropical weather would allow, that the yellow fever might have a poor chance; the great beauty of some Spanish young ladies who came on board, to meet their friends, in their walking dress, a kind of simple and elegant ball costume; the tremendous perspiration and confusion into which I suddenly fell when the Spanish custom-house officer refused for a long time to admit my photographic apparatus into the country; the dispersion of my luggage by the time that the obnoxious articles were passed; my anguish next day on discovering that I had altogether forgotten and lost my Australian journals, several valuable books, etc., which, for use on board ship, I had made into a separate parcel; the strange discomfort of the Hotel Ferdinand, which had floors of marble, doors of iron bars, and no real windows; the terrible still heat which pervaded everything; the gay appearance of the streets, the houses

with doors and bow windows open to the street, except as iron bars can close them; the ladies sitting publicly within, on rows of rocking chairs in large bare stony chambers; the innumerable cigar shops; the numbers of porters, soldiers on guard, or others, who in each corner were seated at small benches, making thousands of the celebrated Havanna cigars and paper cigarettes; the delicious ice creams which we had at the Café Dominica; the coolness with which the ladies called at the café, in their *volantes*, to take ices; the extraordinary and absurd form of the Spanish carriage or *volante*, a kind of huge wheelbarrow with one horse, immense long slender shafts, high wheels, and a negro slave as postillion; the unfortunate breakdown which Mr. Stewart and I had when we attempted to ride in one; the impassibility of the narrow streets when all the fashionable ladies of the city rode out in the afternoon in full dress; the astounding discovery that they did their shopping at nine o'clock at night; my interesting walk over the town early next morning—into the churches also, and the cathedral in which Columbus is buried; the general sensation of yellow fever and uncertainty of life in new-comers; our satisfaction in securing a passage during the day on board a small American screw steamer; our enviable position on board her during the night, to leeward of a fever burying-ground, near a fever hospital, where some fires burning outside must have been consuming the clothes of those recently dead; the details of how many had died on the surrounding ships.

"At daylight of the third day we steamed out of the narrow entrance of the harbour, and passed the formidable *morro* or castle which guards it from American filibusters and others. The little screw steamer, loaded with pine-apples and bananas, made rapid *northing*, greatly assisted by the Gulf Stream. After five or six days at sea we steamed up the long Chesapeake Bay, and landing safely at Baltimore I felt some exultation in at last entering the great United States."

To his brother Herbert.

FRANKLIN HOTEL, PHILADELPHIA,
25th July 1859.

"Having heard nothing to the contrary, I assume that

you have settled down upon the forty acres of land which you were intending to purchase, and I write to inform you that I have not only arrived safely in the Great Union, but am also intending to visit you in the far West—a journey, indeed, which will be very pleasant to me on more than one account. I cannot undertake to give you any written account of the countries I have lately seen, for when 'on the move' I am never in a mood for writing. . . . The great heat, the unhealthiness, and the expense of living in Havanna, caused me to leave it by the first opportunity, which happened to be a small screw steamer leaving next day for Baltimore; and after again passing five days at sea, I found myself at last in a Yankee city.

"My arrival there was about a week since, for after spending several days in examining the monumental city I 'took the cars' for Washington, scrambled over the Capitol, the Washington Monument, the Smithsonian Institute, Lafayette Square with Mr. Sickle's residence, walked along the avenues, and then seeing nothing more of the least interest in the American capital, abruptly took the cars back and came on here. To-morrow morning I am again about to move to New York.

"As far as I can now tell, I shall wait about a week in New York (at the Metropolitan Hotel), until I receive a letter from home in answer to mine from St. Thomas. If I then hear that you are still in Minnesota, I shall take a route by Pittsburg, thence by steamer to Cincinnati and Louisville and St. Louis, and up to St. Paul's, which may occupy nine or ten days, as I intend to stop one day in each of the considerable towns. You need scarcely expect me, then, under three weeks from the present time. Of course I am deprived at present of any news from home, and unless I had luckily received a short note from Henny at the old Panama post office by a lucky chance, I should be six months behind date. At present I am three months behind. By such a lengthy travelling I have become more than ever accustomed to live independently, so that it seems quite natural; and even to meet a relation will seem most strange yet pleasant. The return to England, which has ever been my highest desire, is now scarcely more than two months off, and I can hardly realise it.

"In the list of passengers by the last English steamer from New York I saw the name of F. Jevons. At first I was afraid it might be a mistake for your name, but found the name repeated in other papers. It is curious that I should so nearly have encountered Fred Jevons; but perhaps we should not have known each other. Indeed, I do not feel sure that we two shall very easily recognise one another.

"I will give you my thoughts on American affairs when I have more matured them, and can converse with you. My Australian life has quite prepared me for that in the far West, and a clean floor and a blanket will quite serve me for a bed.

"I have throughout enjoyed the most surprisingly good health, having been often styled by fellow-passengers the 'picture of good health.' A month in the very hottest tropical climates did not affect me, and I escaped the yellow fever of the West Indian ports. I have almost lost two days of my stay in Philadelphia by a little illness from which I am to-day recovered.

"The extreme convenience of the American hotels renders travelling here easy and very tolerable, so that I am almost becoming lazy. Opposite the bedroom where I now write, at 10.30 P.M., is a free concert saloon, whence, every evening, I can hear some really good vocal and concerted music, which is rather a treat.

"Consider this to be the mere epitome of the letter which I should like to write."

To his sister Lucy.

ST. NICHOLAS HOTEL, NEW YORK,
1st August 1859.

"I have now been nearly a week in this great but not very amusing city. . . . I shall start this evening for Pittsburg on the Ohio River, which is the first step of my journey to Minnesota. It will be a splendid excursion, I have no doubt; but you may be sure I am beginning to be quite weary of travelling, and shall be delighted when I can give up all further thoughts of hotels, railways, steamboats, and that most terrible of bores, *baggage*. You can have no idea

what a splendid hotel I have been living in here. It is perhaps the largest in the United States, which is saying a great deal. My bedroom, in which I am now writing, is No. 453; it is rather small, but fitted in a very superior way. . . . Everything is at your service without question for the simple charge of $2.50, or about ten shillings per day: this is the uniform charge in nearly all hotels. Whatever I may say of the Yankees in other matters, certainly they are supreme in the management of their hotels.

"The great towns which I have as yet visited are mere collections of great warehouses, shops, wharves and handsome dwelling-houses—in fact merchants' offices and merchants' houses. The alpha and omega of the whole is *trade*. The same is to a great extent the case with Liverpool—you know how devoid it is of things of higher interest—well, New York, Philadelphia and Baltimore are far worse."

In the letter to his friend Mr. Miller previously quoted Mr. Jevons says:—

"I reached Pittsburg by rail, finding it an intolerable smoky manufacturing town; then to the large town of Cincinnati (the queen of the West), also by rail. I now embarked on one of the Ohio river steamers, a thing which in no way can be said to resemble any steamer seen in English waters. . . . We made a slow tedious passage down the Ohio, stopping to land and receive passengers and cargo every five or ten miles; sometimes I was able to land and walk about a little; then we reached the great Mississippi river, and made a still slower progress up its rapid turbid stream to St. Louis. This town is large and important now, but will soon be the western capital of the States; I left it the same afternoon in a better steamer, and the scenery of the upper Mississippi becoming more nearly beautiful, I was better pleased. I had spent almost two weeks in this monotonous river life before I reached St. Paul, the chief town of Minnesota; but the same evening I succeeded in discovering my brother's settlement, twenty-two miles away, and slept at night in his log hut."

To his sister Lucy.

WAYZATA, near MINNEAPOLIS,
MINNESOTA, U.S.,
17th August 1859.

"You will be glad to learn by this letter that I have reached Herbert's location—the farthest point of my wanderings—safely, and have found him in very good health. It cannot be said that a log hut affords anything approaching luxurious comfort; but you must be aware that when you are hungry even potatoes and Indian corn bread are a comfort to the stomach, and when you are well tired it is delightful to rest upon any sort of a bed. People in this far West country live much more poorly than I should have expected, for as there are no butchers and no animals to butcher, fresh meat is almost unknown. On the whole, I am much pleased with Minnesota; and Minnetonka, which being translated from the Indian language means 'great water,' is a charming but by no means great lake. The numerous woody headlands, the bays, and a solitary island, have a very pretty appearance, and remind me somewhat of my excursions on the Parramatta river. Thus, just opposite to Wayzata is a sort of little peninsula running out and ending in a curious knoll. On the summit of this used formerly to stand an ancient stone which the Indian aborigines worshipped—the stone, indeed, has recently been removed to a museum, but the place is yet known as 'Spirit's Knob.' The fine woods here, with their bright green and abundant foliage, are very beautiful to my eyes, so long wearied by the stiff and monotonous brown gum-trees of Australia. The bushy dells through which the pathways lead you, and the very swamps with their thick green grass and rushes, are also beautiful in their way. . . . Herbert has a fine piece of land, consisting of a sort of flat-topped hill surrounded by a small swamp, which is valuable for affording good logs and grass. At the same time the elevation of his future hut will be such as to render it very healthy. He has done very little towards clearing his own land as yet, but we are now living in a log erection belonging to, but deserted by, another man."

One day whilst staying with his brother, Mr. Jevons

went out alone to fish in a small boat on the little lake. In his eagerness to haul in a large fish he unfortunately overturned the boat, and had to swim to shore—a task of some little difficulty, owing to the large water-lilies which covered the surface of the water, and through which he could hardly make his way. After a pleasant visit of ten days, he started westward to Chicago, which he described as "a large, important, but horribly dull place." Thence he went to Detroit, and through Canada to Niagara, of which he writes: "There was nothing to disappoint me in the great falls, the grandeur and interest of which cannot be exaggerated; I stayed a day and a half there, and had scarcely time to see them fairly."

He continued his journey to Toronto, and then by way of Lake Ontario and the St. Lawrence he reached Montreal, where he walked into the Great Victoria Tubular Bridge, which was then almost completed. From Montreal he proceeded to New York, and found that he was just in time to take a passage by the Cunard steamer which sailed from Boston the next morning. On landing in Liverpool he went to the house of his uncle, Mr. Timothy Jevons.

To his sister Lucy.

GROVE PARK, LIVERPOOL,
18th September 1859.

"I awoke this morning in what appeared to me a new world, until upon consideration I found it to be the old and very dear one. Since daylight this morning I have been most pleasantly engaged in reviving recollections at every turn, and by every question and answer. Park Hill Road, indeed, looked dreary and forsaken beyond measure, and it is needless to seek our home where it used to be; but in Grove Park I have had as kind a welcome as I could possibly have looked for, and there are many things about it that remind me of home. Tommy is so much grown and changed in voice that I might not have known him, but I am gradually discovering that he is the same, except that he is as much a man now as a boy then. So much am I pleased with what I meet here, that I know not what it will be like to meet two sisters, or how I shall contain myself.

"Unless you hear to the contrary, Tom and I shall leave Liverpool by one of the earlier trains on Wednesday, but I have not had time to consult *Bradshaw*.

"It is needless to say more to-day, and what a pleasure it is to drop the old silver pen that has written you so many letters, and reflect that its use in that respect is gone."

CHAPTER V.

1859–1863.

AFTER spending about ten days with his sisters at Streatley on the Thames, Mr. Jevons accompanied them to London, and they settled in lodgings at 8 Porteus Road, Paddington, which continued to be his home until his removal to Manchester in 1863. At the commencement of the winter session he began to attend University College. His younger brother, for the completion of whose education he had advanced funds before he left Australia, was also a student there. From this date his brother Herbert, now the absent member of the family, was his chief correspondent, and to him he writes on the 15th October :—

"I have only been at the college two days as yet, and feel rather strange. I have entered senior Greek and Latin, higher and lower senior mathematics, and senior German, in company throughout with Tom. This is rather a difficult enterprise on my part, since I was in none of these classes before except lower senior mathematics, while it is seven years since I was in Latin or Greek. De Morgan has started right away in differential calculus. I think it would be impossible for me to keep up if I had not Tom's assistance, he having attended senior Greek and Latin last year. . . . London is certainly a stirring place, but the atmosphere is appalling to one accustomed to the clear skies of Australia."

During the autumn Mr. Jevons wrote a paper entitled "Remarks on the Australian Gold Fields," which was read at the November meeting of the Manchester Literary and Philosophical Society, and was published in their volume of memoirs for the session 1859-60.

To his brother Herbert.

8 PORTEUS ROAD, PADDINGTON,
27th December 1859.

"A week since we had a rather sharp frost. Tom and myself had two good days' skating on the Serpentine and Kensington Garden pond. After six years' interval I was rather unsteady at first, but the second day skated, I think, as well as ever. Otherwise I cannot say that I find the slightest pleasure in going outside of the front door, and in consequence sit at home during these days (the Christmas holidays) in pretty constant work at mathematics, political economy, and such-like light occupations. . . . I should uncommonly like to see a North American winter. I often feel seriously 'riled' at the thick atmosphere, mud, and gloomy streets of London, when I go over in memory the beautiful bright countries, or clean neat towns, I have lately seen, and a very good and sensible novel (*Geoffry Hamlin*) which I read—exactly descriptive of Australian bush life—made me think very regretfully of the skies, waters, and woods of that land. My only resource is to turn my back to the window and plunge into De Morgan's differential calculus."

To his brother Herbert.

8 PORTEUS ROAD, PADDINGTON, LONDON, W.,
27th January 1860.

"Time slips by with me most rapidly, and things sometimes appear not a little dreary, although we have in our lodgings all the comforts of a home. I should feel very different, perhaps, if I were paying my expenses, and yet I am not inclined to cut off from my future prospects by giving up the chance of study. I have no definite plan of earning money, but after my B.A. will try what can be done in the way of writing or teaching, so as to keep myself while working for my M.A., which I have a great desire to take in the political economy and mental philosophy branch, as these are entirely the subjects I should follow in any case. Harry Roscoe, whom I saw in London at Christmas, is rather indignant that I am no longer a chemist, and wants to know how I shall get my bread, which perhaps is quite a pertinent question.

"I find the classes at college a little dull—the charm is rubbed off a few things; but then one learns more and more to adore De Morgan as an unfathomable fund of mathematics. We were delighted the other day when, in the higher senior, he at last appeared conscious that a demonstration about differential equations, which extended through the lecture, was difficult; he promised, indeed, to repeat it. But then one is disappointed to find that the hardest thing he gives in any of his classes is still to him a trifle, and that the bounds of mathematical knowledge are yet out of sight. I am working against such great odds in mathematics, Latin, and Greek, that I have at present no time to give for mental philosophy, in which my chief strength lies. Yet I spend much time in political economy, as there is a small scholarship of £30 a year for three years to be competed for at the end of this year.

"I have yet to mention the subject which is uppermost in men's minds here—viz., the rifle movement, concerning which the Queen, in her Parliament speech, expressed her gratification and pride. Indeed, Englishmen are now giving an unlooked-for proof that they are at least as good a race as ever, and an actual army of 100,000 volunteers has been enrolled in the last few months, which I expect will be nearly doubled during this year. It is done in such a very sensible and *bonâ fide* manner, that I do not doubt the volunteers will be a permanent and most important institution, rendering invasion or alarm absurd, giving additional strength to all good government, and in some years to come, perhaps, rendering a reduction of the regular army possible. . . . I have myself joined the Queen's Own Rifles, a corps in the Westminster Brigade, chiefly because Frank and Fred Roscoe were already in it. It is also rather a good corps, being the Queen's, and numbering already about 300 men, which will be increased to 500 or 600. The Westminster Brigade will be one of the chief, comprehending several other corps, and perhaps 1500 men. I have as yet been only twice to drill, which is carried on at night or on Saturday afternoon in Westminster Hall. And that grand old hall presents a very stirring, not to say warlike and alarming scene, when several hundred gentlemen, in a number of squads or companies, are

going through their exercises, from the first awkward marching and facing to the finished practice with the Enfield rifle and a bright sword bayonet. For the present nearly all of the Queen's drill in plain clothes, and it is not necessary to appear in uniform until the summer, when I daresay there will be a grand field-day in Hyde Park."

The following letter contains the first allusion to the "Theory of Political Economy," a brief account of which Mr. Jevons sent to the meeting of the British Association in 1862, and which he further developed and published in 1871 under the title of *A Theory of Political Economy.*

To his brother Herbert.

8 PORTEUS ROAD, PADDINGTON,
1st June 1860.

". . . During the last session I have worked a good deal at political economy; in the last few months I have fortunately struck out what I have no doubt is *the true Theory of Economy*, so thorough-going and consistent, that I cannot now read other books on the subject without indignation. While the theory is entirely mathematical in principle, I show, at the same time, how the data of calculation are so complicated as to be for the present hopeless. Nevertheless, I obtain from the mathematical principles all the chief laws at which political economists have previously arrived, only arranged in a series of definitions, axioms, and theories almost as rigorous and connected as if they were so many geometrical problems. One of the most important axioms is, that as the quantity of any commodity, for instance, plain food, which a man has to consume, increases, so the utility or benefit derived from the last portion used decreases in degree. The decrease of enjoyment between the beginning and end of a meal may be taken as an example. And I assume that on an average, the *ratio of utility* is some continuous mathematical function of the quantity of commodity. This law of utility has, in fact, always been assumed by political economists under the more complex form and name of the Law of Supply and Demand. But once fairly stated in its simple form, it opens up the whole of the subject. Most of the conclusions are, of course, the

old ones stated in a consistent form; but my definition of capital and law of the interest of capital are, as far as I have seen, quite new. I have no idea of letting these things lie by till somebody else has the advantage of them, and shall therefore try to publish them next spring.

"I am extremely interested in metaphysics; almost too much, in fact, so that I have had some doubts whether twenty-one months' continuous work at them for the M.A. would not be rather too much. The ultimate question of philosophy, that between idealism and materialism, is necessarily an insoluble one, but one also on which we cannot avoid speculating with interest. Nor can I say that I feel bottom; I am somewhat as I was among the water-lilies and rushes—out of my depth in a small Minnesota lake when the fishes proved a too interesting sport for my prudence.

"I find volunteering an excellent antidote to metaphysics; marching to a good band in full regimental order is really a most inspiring thing, and when we form a battalion square, bristling with bayonets, the effect is most warlike. I generally go on Saturday afternoons in uniform for parade and battalion drill; also once a week before breakfast for skirmishing exercise in Hyde Park; on the latter occasion I have some eight or ten miles' walking before breakfast, with the addition of a rifle to carry, and often a good deal of double marching (running). For four hours every day of the week, morning and evening, some or other of our corps are at drill, so that it is only a wonder that we do not make more rapid progress. We muster from fifty to a hundred in the mornings, and from four hundred to six hundred on Saturdays."

To his brother Herbert.

8 PORTEUS ROAD, PADDINGTON,
25th July 1860.

"On returning home with Tom from a walk of three days in North Wales, I am glad to find a letter from you arrived in the meantime, which I answer at once, as it appears to me a long time since I last wrote. . . .

"In the loss of most of the corn you planted, you experience some of the troubles of farming. It is doubtless not

a cheering prospect to remain for many years in Minnesota, and I am somewhat sorry that you did not choose, when you were making a change, an English colony, whether town or country, where the society would, in the long run, have proved more suitable. . . . It is, I think, not practicable for you to farm in England, as you would have to compete with experienced farmers, and to struggle against high rents in a manner almost unknown in America; in short, you would require an agricultural education, and considerable capital, and might even then be ruined by a bad season or by an unfortunate choice. As to whether you would again undertake a town life and a clerk's work depends entirely on your own feelings; but you should not forget, after the hard but invigorating work of a settler's life, how dispiriting a town life may be to those who are not strongly enough excited by the love of gain, or some other love, and who have been once led to take wider views of the world than what are restricted within brick walls. For myself, if I were not affected by what I may almost call an unfortunate love of study, and of particular pursuits, I should not long be in London, but would prefer labouring in some fine open wild country; and unless I can really succeed in what I have in hand, I shall never cease to regret that I ever left Australia. If I undertake the M.A., as I intend, there will be nothing but study before me for two whole years, and then there is no better prospect than before of earning a living. I feel really so much better suited to a literary life than any other that I shall lay myself out for it, perhaps beginning with much work and small pay in the newspaper line.

"As regards your coming to London, we should all, I am sure, be glad to be reunited as far as possible, and if you could obtain a suitable place, and make up your mind to the murky streets, super-civilised manners, and contracted notions of Londoners—nothing could be better. But you must be aware that we have no real home in London—only lodgings. From our limited incomes, and the uncertainties in which we are all placed, it is not possible to take a permanent house, and we are lucky in having found lodgings comfortable, and on reasonable terms, and kept by a family who are apparently anxious for us to remain!

". . . Now, however, I must attack in earnest the catalogue of work for the B.A. in October—viz., Latin, Greek, mathematics, Roman history, Greek history, English history, French, animal physiology, logic, natural philosophy, moral philosophy, all of which require looking up seriously, and many to be learnt from the beginning. In the college examinations I only went in for the mental philosophy and political economy. In the first the result came out, equal prizes and certificates—Theodore Waterhouse, W. S. Jevons. This is, on the whole, a satisfactory result since T. Waterhouse is certainly the first student of the college during the session, and has carried all other prizes before him. I had hopes of beating him, but am satisfied, considering that he attended better to the lectures than myself, to be equal.

" In political economy I had a sad reverse, such indeed as I never had before, for in spite of having studied the subject independently and originally, and having read some dozens of the best works in it, almost neglecting other classes for the purpose, I was placed third or fourth when I felt confident of the first prize. This I can only attribute to a difference of opinion, which is perfectly allowable, having prejudiced the professor against my answers. However, I shall fully avenge myself when I bring out my *Theory of Economy*, and re-establish the science on a sensible basis. . . . I do not wonder at your objection to further changes, since I feel the same myself—a certain restlessness seems likely to be the ruin of our family. We are all of us rolling stones, and gather no moss. I half suspect that I shall sometime be again an emigrant, in which case I shall certainly make for the beautiful scenery and the English-like colony of New Zealand, but I will first have a fair try of a good many years here."

Previous to his brief walking tour in North Wales, Mr. Jevons had spent a pleasant fortnight at Englefield Green with his sisters, but this was all the holiday from work which he allowed himself during the long vacation. In October he took his B.A. degree, and resumed his attendance at University College, but without the companionship of his brother, who, having also taken his B.A. degree, had left

College and removed to Liverpool to enter Messrs. Rathbone's office. On the 28th November Mr. Jevons wrote from Porteus Road to his brother Herbert:—

"I am now attending college again regularly. My classes are De Morgan's higher senior mathematics, Potter's senior mathematical natural philosophy, Malden's extra Greek class, and Mr. Martineau's mental philosophy class in the Manchester New College, which is close at hand in University Hall. I am, of course, better up to De Morgan's brain-rackings this session, and shall devote much time to mathematics, yet, from having no natural talent for figures or quick memory, have no hope of becoming a practical mathematician. Besides, it is somewhat late in the day at twenty-six to learn mathematics, with which you will succeed from the first or never. The extra Greek class is a very pleasant one, being a lecture once a week for the elder students out of the regular course. We are now reading a Greek tragedy, and are soon to do some of Aristotle, which is what I chiefly desire. I have not much knowledge of Greek, but am gaining by degrees a proper admiration for Greeks, who, as philosophers, poets, generals, and so forth, certainly exceeded anything which individuals of all later time are likely to produce.

" . . . Metaphysics is a rather too interesting study, and I am not inclined to pursue it so much as those, such as political economy and moral philosophy, which are equally in the clouds at present, but might become useful.

"I expect every success from my theory of political economy, which seems to develop itself with that facility which is a proof of its soundness. It assumes the form of a complicated mathematical problem, from which all the common laws with due limitations flow. Independently, however, of the mathematical form, it has led me to a new view of the action of *capital*, which affords a determining principle for *interest*, *profits of trade*, *wages*; and I now perceive how the want of knowledge of this determining principle throws the more complicated discussions of economists into confusion. The common law is that demand and supply of labour and capital determine the division between wages and profits. But I shall show that the whole capital

employed can only be paid for at the same rate as the *last portion added*; hence it is the increase of produce or advantage, which this last addition gives, that determines the interest of the whole.

"I shall try to spare more time for this theory before long, and get it into form without much delay."

To his sister Lucy and his brother Tom he wrote on the 9th December 1860:—

"You will hear with pleasure, if not with surprise, that the Ricardo Scholarship is actually within my reach, although it will not be formally given me and published until the College Council meet again next January. The examination was for six hours last Tuesday, and proved a rather hard fight. The amount of lucre, you know, is £60, but the first £20 is not payable till February."

The Christmas of 1860 Mr. Jevons spent at his uncle's home in Liverpool. The weather was intensely cold, and he had the pleasure of a few days' good skating—a recreation of which he was always very fond. On his return to London, in addition to his college work, he found time for writing, and between January and August he prepared the following articles for the *Chemical Dictionary*, edited by H. Watts: "Balance," "Barometer," "Cloud," "Gold," "Assay," "Hydrometer," "Hygrometer," "Thermometer," "Volumenometer." They were all published in the course of the work. To the July number of the *National Review* he contributed an article, "Light and Sunlight." In September he attended the meetings of the British Association at Manchester, and wrote a series of seven articles for the *Manchester Examiner*, giving an account of the work of the sections. He also contributed a paper to the Mathematical and Physical Section, "On the Deficiency of Rain in an Elevated Raingauge as caused by Wind"—this was afterwards printed in the *Philosophical Magazine* for December. But this was not all his work. In October 1860 he first began to form diagrams to exhibit some statistics he had collected in his reading in the British Museum Library, and this led to the idea of a *Statistical Atlas*, of which he gives the following account:—

To his brother Herbert.

7th April 1861.

"I am very busy at present with an apparently dry and laborious piece of work, namely, compiling quantities of statistics concerning Great Britain, which are to be exhibited in the form of curves, and, if possible, published as a *Statistical Atlas.* The work will, I think, be very interesting and important when done, but the labour of rummaging the chaos of Parliamentary Papers, and then copying and calculating great columns of figures, is rather depressing to the spirits. I have been the last five days at the Museum upon it, but next week I shall have college work again to interfere with it. Almost the whole of the statistics go back to 1780 or 1800, a large part extend to 1700 or 1720, and some—for instance, the price of corn—as far back as 1400. The quantity of statistics which I shall exhibit in about thirty plates will, I think, rather astonish people. For instance, there will be the population—births, deaths, marriages, emigration, etc., as far as known; the revenue from various sources, the expenditure, the Government loans, the National Debt at different periods, property in saving banks, fire offices, etc.; the operations of the clearing houses, Bank of England returns since 1770, circulation since 1700, *weekly returns* of Bank of England since 1843, the price of the funds since 1723; imports, exports to different countries, supplies of cotton, corn, wool, and every principal article; produce and prices of the metals, provisions, materials, etc.; the condition as to pauperism, the rate of wages, strikes (perhaps), etc.; the naval and military force of the country, the number of Acts of Parliament, the number of patents, as a whole, and in various branches since 1623; the criminal condition of the country; literature, etc.

"The chief interest of the work will be in the light thrown upon the commercial storms of 1793, 1815, 1826, 1839, 1847, 1857, etc., the causes of which will be rendered more or less apparent. I find that the number of Acts of Parliament, the number of patents, and the number of bricks manufactured, are the best indications of an approaching panic, which arises generally from a large investment of labour in works not immediately profitable, as machinery,

canals, railways, etc. It is truly curious how well the curve of *bricks produced* shows this, bricks and mortar being the most enduring form of product. Most of the statistics, of course, are generally known, but have never been so fully combined or exhibited *graphically*. The statistics of patents, and some concerning literature, will be quite new. The mode of exhibiting numbers by curves and lines has, of course, been practised more or less any time on this side the Deluge. At the end of last century, indeed, I find that a book of *Charts of Trade* was published, exactly resembling mine in principle; but in statistics the method, never much used, has fallen almost entirely into disuse. It ought, I consider, to be almost as much used as *maps* are used in geography. I have only properly undertaken the work since Christmas, and have now got nearly as much statistics as I require or can obtain, but a large part of the more wearying work remains."

Early in July Mr. Jevons again paid a short visit to North Wales. He wrote an account to his brother Tom of the interest with which he climbed one of the Eifel mountains near Clynnog, and found at the summit "remarkable British remains, consisting of a great rampart of loose stones surrounding the top of the hill, with cairns and abundant circular remains of loose stones, as if they were from old sheep-pens, but evidently having been dwelling-places." Two days after he "tried to go up Cader Idris, but went somewhat wrong, and clouds and rain coming on, had a long wet walk through bogs for nothing—enough to damp any one's ardour." On his way back to London he stopped at Stourbridge; he was at that time much interested in endeavouring to trace out his ancestors, and as his great-great-grandfather Job Jevon was buried at Old Swinford, in the neighbourhood of Stourbridge, he examined the churchyard, but failed to find his tomb. That the name Jevons was of Welsh origin he felt sure, and in October, when he was occupied in writing an essay on Celtic Literature in competition for a prize offered at University College, he wrote to his brother Tom:—"In the course of the work I was lucky enough to turn up a final confirmation of the theory Jevan and Jevons. In an old vocabulary of the

extinct Cornish Celtic language by Edward Llwyd, printed 1707, I found 'Jevan, John. Hence some families of the name of Evans, retaining the old orthography, write Jevans.'" On his return to London he began to read, especially with a view to his M.A. degree.

To his brother Tom.

8 PORTEUS ROAD, 23*d July* 1861.

". . . I have begun to read Mansel's Aldrich's *Artis Logicæ Rudimenta*, of which Aldrich makes 50 pages and Mansel 250, and the 250 are full of nothing but a jargon of five different languages, about the most useless and confusing historical points. I fear Sir W. Hamilton has thrown us back into scholasticism, judging from himself and his bright pupils. Nothing can be more devoid of interest or profit than this sort of learning. It only tends entirely to becloud us, as it did Sir W. H. to a great extent. Nevertheless I read the books as a good exercise in the five languages. I am also reading a little of Leibnitz, but it is great stuff; his pre-established harmony is about the best, and his *Monad. Philosophy* is just what you might expect. I have looked into Kant's Critique (trans.), and shall read part of it some time. It is teeming with demonstrations, which are no demonstrations to me."

To his brother Tom.

8 PORTEUS ROAD, 3*d December* 1861.

". . . Volunteering still prospers here. . . . Last Saturday our prizes were distributed in Westminster Hall with considerable ceremony. . . . In our Company we had only the three regulation prizes of three Enfield rifles, given according to the results of the class firing at 650 and 700 yards. Now it happened that Frank, another sergeant, and myself, made equal scores of five out of ten shots at 650 and 700—hence our order was determined by the scores at 450-600 yards—which made Frank first and myself last. I, however, received a London Armoury Company's Enfield rifle as the third prize, which is so far satisfactory. . . . I am beginning to get fairly into my M.A. work. Only lately the *additional* subjects for the M.A. were published, and are as follows:—

"'On the Nature and Principles of Social Order and Social Progress, or of Civilisation,' and in the history of philosophy, 'Greek Speculation—the Theætetus and Gorgias of Plato, and the Nicomachean Ethics of Aristotle.' Is not this a pretty prospect? Just fancy learning the whole of Greek Speculation—in addition to reading Buckle—and buckling Plato and Aristotle. The ethics alone is no slight job, especially as Malden told us there were many parts he could not translate.

"Then there is the whole of mental and moral philosophy—logic, political economy, etc. I am now partly engaged reading old fellows' works more or less, such as Berkeley, Hobbes, Leibnitz, Descartes, Spinoza, Bacon, etc. I am by degrees getting into the habit of reading the scholastic Latin, which will be a great convenience. I have also tried a little of Kant's German, which is not quite so hard as one would expect.

"My statistical matters proceed slowly, and the mere drawing of diagrams takes up an incredible deal of time."

On the 8th December 1861 he wrote in his journal:—"It is now more than two years since my return to London, and I have been during this time almost incessantly working at philosophical subjects. In leaving Australia I had scarcely hoped to have more than a single year free in this manner, and I now seem to have heights of general learning before me which then seemed unapproachable. The M.A. degree, for instance, was then quite beyond hope.

"Within these two years my tastes have much widened, so that I may almost say I despise no kind of knowledge. Formerly I was unable to appreciate the value of classical and antiquarian learning, or the worth of poetry and general literature. It is only by degrees, for instance, that Shakespeare becomes quite congenial to me. At the same time the return from the newness of a colony to the venerable antiquity of this old country has given me almost an exaggerated taste for the antique. Thus nothing is more pleasant to me than to make some fresh slight discovery concerning our ancestors, worthless people though they seem to have generally been.

"The subjects which had pressed themselves upon me

as my proper sphere of employment, viz. political economy and the social sciences, seem opening before me by degrees in a manner exceeding my first hopes. But it is of course always true that we can have no idea of what is to be found out and not yet known. I cannot avoid also paying some attention to *philosophy proper*, in addition to what is required for my degree, and I begin to understand things which were utterly beyond me some years ago. For a year, perhaps, I have entertained hopes of performing a general analysis of human knowledge, in which the fallacies of words would be as far as possible avoided, and *philosophy would be shown to consist solely in pointing out the likeness of things.*

"About October 1860, having then recently commenced reading at the Museum library, and met some statistics, I began to form some diagrams to exhibit them, the first, I think, showing Mr. Newmarch's Bill Circulation Research. I hit upon a mode of dividing a sheet of paper into one-tenth inch and then pricking off curves through it when in Sydney, and the square was ready at hand.

"After doing two or three diagrams the results appeared so interesting that I contemplated forming a series for my own information. Then it occurred to me that publication might be possible, and I finally undertook to form a statistical atlas of say thirty plates, exhibiting all the chief materials of *historical statistics.* For the last year this atlas has been my chief employment, and I fear to look back upon the labour I have spent in searching all likely books for series of statistics, then copying, calculating, arranging, and drawing the diagrams.

"Towards the end of last October I had some twenty-eight diagrams more or less finished in the first copy, and thought it time to arrange for publication. I first wrote to Taylor and Walton, describing my work and wishes, and soon had a talk with Mr. Walton, a very respectable old gentleman, who was quite disinclined to undertake the publication, but took interest in it, and gave useful advice. He told me to apply to Longmans, to whom I accordingly wrote; receiving a note back from Mr. W. Longmans, I was in much hopes visiting Paternoster Row (I never see Paternoster Row without remembering when I once men-

tioned to my father that I had been through it on my first coming to London, and he expressed his regret in a letter or conversation, I forget which, that I seemed so little impressed with the memory of the great men who had trod that narrow lane with so various hopes and desires). He likewise took a pleasing interest in them, but was equally clear about having nothing further to do with them. He, however, recommended several map publishers, who would most suitably undertake the work, and also gave me an introduction to Mr. Newmarch. My spirits naturally were now zero, but fell still lower on visiting Mr. Newmarch at the insurance office, who looked at my diagrams without *interest*, and almost without a word, so that I soon left him. I took dinner and a glass of ale to restore my spirits, and then through crowded Cheapside, Fleet Street, and Strand, made my way to Charing Cross to Mr. Stanford, the map publisher there—a dry, sensible man of business, apparently with a liking for maps, so that he seemed pleased with the diagrams. Whether for this reason or not, he was not disinclined to undertake some risk in publishing them, but talked much of the opinions he would have to obtain upon them, and the toadying of the statistical magnates which would have to be done. To this I was so averse that before long I saw the work must be done at my own risk, and I accordingly asked him to give some rough estimate."

Early in January 1862 Mr. Jevons' eldest sister was married to John Hutton, Esq., of Beaumaris; but his younger sister still continued to reside with him in London. In August 1861 Mr. Herbert Jevons had returned from Minnesota; and, during the winter, 1861-62, he also made his home in Porteus Road.

To his brother Tom.

UNIVERSITY COLLEGE,
28th April 1862.

"It is true I have not troubled you with many letters lately; but, one way or another, we hear all that is essential of each other. The M.A. work gets on pretty well, but I do not like so much of historical philosophy as the whole of Greek Speculation. I have finished reading the Nicom-

achean ethics, and the *Theætetus* and *Gorgias* straight through, and find Aristotle and Plato becoming pretty easy reading, especially the former. I am much inclined to think, however, that Plato is not only a more interesting writer than Aristotle, but that he had the way to the truth more clearly before him; putting aside, of course, all the absurd fancies and ontological speculations. Perhaps, however, the better parts to which I allude are truly Socratic. The *Theætetus* is very admirable, and I am willing to have it set.

" . . . I have been rather vexed that more attention has not been paid to the Brighton Review. It was by far the most important and successful of volunteer undertakings. In fact I quite wonder at the punctuality and good management displayed by volunteers and regulars.

"I got up at 3.30, got two stunning cups of coffee and an egg, and then rushed off to headquarters, reaching there a little before 4 A.M. Many were there already, and by 5.30 we were fully assembled and had reached the station. In a few minutes we were in the train; the Scotch had a little the start of us, but, otherwise, we were the earliest from Victoria Station, got to Brighton shortly after 6 A.M., and marched right away out of the station, through a part of the town and up to a cricket ground surrounded with walls, where we were kept for two hours in excellent discipline, and fed upon nauseous coffee and bread and butter. Then, formed into two battalions of eight companies each, total about 1000 strong at least. Marched in splendid order straight to the Pavilion at Brighton; all the other corps were collected at other points of the town. After waiting about three-quarters of an hour for other corps to pass, we joined in the second division of the army, and marched along the parade in sub-divisions; and, on reaching the Downs, in fours to the point for forming line of contiguous battalions. Battle began about 3.15 P.M., but we were posted in reserve behind two haystacks, and saw very little of the first and best attack. As far as we could see, the whole scene was splendid, and quite unlike anything else; but, if you do not know the ground, it is not easy to conceive the appearance.

"Between 5 and 6 P.M. we advanced from our cover,

formed with the rest of the second division a tremendous long line, and, after much fire from skirmishers, pursued the enemy up to top of hill, and drove them off into the sea beyond. The last double up the hill did for a few of our fellows, and the doctors looked after them, but it was no easy work, the distance being considerable and all out from 4 A.M. We were very thirsty and hungry, but our colonels marched us right away back through the town and put us into the railway train. Fellows were greatly astonished when they found all chances of beer gone, but fell upon their haversacks; and, having become convivial, made a good meal on the journey home. Reached London at 10.45. . . . I was not a bit tired, and it did me a deal of good."

In June Mr. Jevons passed his examination for the degree of Master of Arts at the University of London in the third branch, which included logic and moral philosophy, political philosophy, history of philosophy, and political economy; he received the gold medal which is given to the best candidate in each branch, if, in the opinion of the examiners, his answers are of sufficient merit to deserve it.

To the *London Quarterly Review* he contributed in April an article on the "Spectrum"; and in the *Philosophical Magazine* for July he published a notice of Kirchkoff's researches on the "Spectrum."

In the summer of 1862 Mr. Herbert Jevons decided, partly on account of his health, to go to Australia, with a view of settling there; the following letter was addressed to him at Liverpool, shortly before he sailed.

To his brother Herbert.

8 PORTEUS ROAD, 3*d July* 1862.

"Whatever you do, don't do it in a hurry, and all off hand. Whether you go to Melbourne or not, there can be no need to go by the very next ship. Henny and I shall of course come down to Liverpool to see you off, and we cannot come without some week or two of notice.

"I have been much occupied of late in bringing out the diagrams, which were finished just at the time of the examination. As yet I am quite unaware of the number sold, if any—and am very far from sanguine about the result.

The total cost will be some £30 or £35, so that one cannot lose very much.

"The distribution of prizes took place on Tuesday, and I was mentioned in the report with reference to the M.A. I was disappointed, however, with regard to a prize of £5 for an essay on Celtic literature. There were three competitors—each of them deserving of a prize, as Masson the judge said—but a man now at Cambridge, and a B.A., carried it off, from having a considerable knowledge of Celtic; in which, of course, my acquaintance is as near zero as can well be imagined. The sympathies of the audience rather collapsed when a Cambridge man was announced successful. It is certainly not right that men who have all the rich prizes of Cambridge and Oxford, should come back and steal our small rewards, when it is impossible for us to approach the other universities unless by beginning from the beginning again.

"On Saturday our regiment was inspected in Regent's Park. There was a good attendance of some 800 or 900 men in all—and all the manœuvres went off, for the most part, in a very satisfactory manner. There are no signs of decay about the Queen's. In firing my classes I have had the misfortune to miss one of them—owing to using a new rifle, with the sighting of which I was not acquainted. This loses me the marksman's badge next year. I am now, however, just taking the duties and badge of a sergeant."

Owing to the great expense of publishing his proposed Statistical Atlas, Mr. Jevons had decided, in the first place, to bring out two diagrams; one showing all the weekly accounts of the Bank of England since 1844, with the circulation and the bank minimum rate of discount; the other showing the price of the English funds, the price of wheat, the number of bankruptcies, and the rate of discount monthly since 1731. In a letter, dated 3d September 1862, Mr. Jevons thus describes the purpose of them.

"The diagrams, which you are so good as to intend noticing in the *Economist*, accompany this.

"They are designed, not so much to allow of reference to particular numbers, which can be better had from printed

tables of figures, as to exhibit to the eye the general results of large masses of figures which it is hopeless to attack in any other way than by graphical representation.

"My diagrams not only show the minutest details given in the tables, but also supersede the taking of averages, since the eye or mind of itself notices the *general course* of a set of numbers.

"It is only by representing large masses of statistics in this manner that any sure foundation can be laid for political economical arguments. Most statistical arguments depend upon a few figures picked out at random.

"In the latter part of the funds diagram, it is very obvious that a rise in the price of corn is followed by a rise in the rate of interest, and by increased bankruptcy. This is remarked in one of the *notes* at the foot, where I also speak of corn as forming part of the capital of the country. It perhaps sounds rather odd, as we are accustomed to think of capital as so much money, but the expression is theoretically correct.

"The bank diagram, when properly studied, throws light on many questions, especially that of the circulation of Bank of England notes, which is seen to be comparatively little variable, *but always rises slowly for two or even three years after a large accumulation of bullion has taken place, as in* 1852 *and* 1858. *The same seems now to be taking place* even in a greater degree, the present circulation being nearly £1,500,000 over that of this time last year, so the *Times* says.

"It is all nonsense to ascribe a rise in prices to bank notes being increased in numbers. It is a superabundance of *gold* that raises prices and perhaps quickens business, and the increased circulation of notes is the *result*, so clearly shown on the diagram.

"I send these few lines because the *purpose* of the diagrams is not stated upon the face of them."

To his brother Herbert.

BEAUMARIS,
Sunday, 17th August 1862.

"As it is so few days since you started, it is of course

unlikely I should have much to tell you of here. We were sorry to find from the *Mercury* that the *Champion* did not get clear away on the first try, but was driven back with loss of an anchor and cable. On hearing this Tom and I went down and ascertained the position of the *Champion;* but Baines and Co., to more than one inquiry, told us there was no steamer going to it, and no means of communication. We intended, indeed, to go off and see you by sailing boat. On getting down to the stage, however, the wind seemed to be blowing so fresh, and the ship lay so far from New Brighton, that we thought it more prudent to give up the plan.

"Your letter, sent back by the tug-boat, gave us much pleasure, as it seemed to show you would have a cheerful voyage in spite of some discomforts. By the time you get this you will feel disposed to forget the voyage, and set to the disagreeable work of finding employment in a large city like Melbourne. . . .

"Our family enjoy some blessings, but also lie under certain curses—one of which is a certain stupid simplicity of character which continually mars their undertakings. A little wiliness, and a rather thicker skin, would make us succeed far better in this world; and I really cannot believe that success in this world is always to be sacrificed. We have between us so much good-nature and inflexible honesty, that it sometimes seems as if we can none of us ever be of the least use to friend or foe.

"There is nothing more necessary than to remember that everybody you meet is more or less imperfect and apt to do wrong. Take this as a matter of course, and make the best of it. You will have hard enough work to keep yourself always right.

"I write down a few such reflections, which have often occurred to me before, because it is now most necessary that you should take some active steps to secure good success in a new continent. A still greater fault, and one more peculiar to yourself among our family, is a want of deliberation in planning an undertaking, and then a want of resolution in carrying it through the first slight difficulties. Everything that is worth doing must be commenced with some degree

of painful exertion, only to be recompensed by the *hope* of success. It is only as work actually proves successful and easy from practice that it can be agreeable and spontaneous. The theory which you once propounded to me, that everything should be done spontaneously, that is, without exertion, is not only totally false but fatally so, if it could really ever be carried out in practice. It is like expecting fruit to fall into your mouth as you spontaneously sit upon the ground; it might do so by chance, but most people who waited for it would die of starvation. A man of any sense climbs the tree at the cost of much labour and some risk, but is rewarded by as much fruit as he requires. The life of a civilised man is distinguished from that of a savage chiefly by the rule that the former exerts himself for future, the latter only for present purposes. The degree in which a man studies the future, and sacrifices present ease to probable future satisfaction, is the best measure of his ability as a builder of his own fortune, apart, of course, from all consideration of what he esteems good-fortune.

I shall probably leave Beaumaris in a day or two, and return almost straight to London, but it will be time enough in succeeding mails to tell you of our affairs in England."

To his brother Herbert.

8 PORTEUS ROAD, W.,
14th September 1862.

"Although I am somewhat tired by writing most of the day and reading the rest, I must at least make a beginning of a letter to you, as for the present at least I shall certainly not let a mail go without a letter.

"Both the letter you sent ashore by me and that by the tug-boat, tended greatly to diminish the trouble which we could not but feel at losing you again for a series of years. The members of our family do not always agree together perfectly in little things of common life, but they never cease to regard each other in everything that is of greater moment; and as I was the one so frequently thought of when in your distant position, so will you be now. . . .

"Landing in a colony is very gloomy, anxious work, as far as I had any experience of it, and it can scarcely be so

well for you as it was for me. As you know, however, I was very short of money on getting to Sydney—and the mint prospects altogether were in a state of uncertainty. I am now in no enviable position here, as, my college work being entirely finished, I must look for money-making employment. To make money by writing is so very severe an employment that I am almost afraid of it, and yet it seems the only one I could thoroughly take to.

"I am beginning some articles in the *Spectator*—one in this week's number. I am also finishing some very laborious statistical calculations, what, in fact, you copied out for me, —the bank returns,—and shall probably offer them to the *Economist*. I may also undertake some other articles. I have resolved, however, at last to let out my theory of economy, and have accordingly written a short paper entitled, 'Notice of a General Mathematical Theory of Economy,' which will, I hope, be read at the British Association Meeting at the beginning of next month. Although I know pretty well the paper is perhaps worth all the others that will be read there put together, I cannot pretend to say how it will be received—whether it will be read at all, or whether it won't be considered nonsense. . . . I am very curious, indeed, to know what effect my theory will have both upon my friends and the world in general. I shall watch it like an artilleryman watches the flight of a shell or shot, to see whether its effects equal his intentions.

"Yesterday I had the satisfaction of seeing my diagrams in a publisher's window in the Royal Exchange. I persuaded Stanford to send them on sale, as he promised, to several places, but I do not yet know how many are sold."

Until the last few years of his life Mr. Jevons was accustomed to enter in a note-book the title and date of everything which he published. In September 1862 he made this entry:—

"The following papers were forwarded to the meeting of the British Association at Cambridge. I was informed by the Secretary that they were read before the F Section, and the second was approved of.

"1. A 'Notice of a General Mathematical Theory of Political Economy.'

"2. 'On the Study of Periodic Commercial Fluctuations, with five diagrams.'

"Brief abstracts are contained in the *Report of the Proceedings*, 1862, pp. 157, 158. A fuller explanation and publication of the above-mentioned theory is deferred until a more suitable period for establishing a matter of such difficulty."

In his journal Mr. Jevons writes on 5th October 1862: "I have generally taken it for granted that, though my style of writing was generally heavy, I might, by a little practice, make it lighter, and thus newspaper writing or magazine contributing was any time within my power. But in writing a couple of articles for the *Spectator*, and an essay, I get on so slowly, painfully, and heavily, that I almost distrust my former confidence. If my distrust be well founded, I here meet a new obstacle to my present success. Light easy writing is not essential to philosophical subjects; it is perhaps rather prejudicial to ultimate soundness; but, of course, it is nearly essential to making any money by a literary life.

"During the last five days I have been almost wholly occupied in entertaining my uncle, William Jevons, now a bent old man, but filled with the true affection and the calm clear mind for which he and my father have been remarkable. . . . His expressions of affection and satisfaction are so warm that I must feel pleasure in believing him to be truly pleased. But I never have unalloyed satisfaction in society, especially where I am not perfectly at my ease, for every now and then I unskilfully say things which I regret unavailingly long after, and now especially, I am so glum and wrapped up in my serious thoughts, that I can scarcely give any attention to the entertainment of others.

"Yesterday afternoon, after leaving Uncle William at the Victoria Station, I wandered again to Westminster Abbey, of which I shall never tire. Nowhere else can one feel so surrounded and encouraged by the greatness of humanity. After looking over a great many tombs of second-rate heroes and writers, I succeeded in finding the venerable tomb of Chaucer—venerable in its age and simplicity amongst the venerable. The crumbling stone has lost its inscription, yet his tales remain not only the well of

English undefiled, the first great monument of the greatest of languages, but a mine of true simple poetry, and of sound philosophy. Shakespeare excepted, he is doubtless the poet that I shall best admire among the English."

In December 1862 he wrote in his journal: "It was a bold and momentous decision which brought me out of Australia. I shall not regret it, even if my remaining days be spent in poverty. In spite of industry I could not have done much in Sydney. I thought what I did very clever then, but it seems foolishness to me now, and my first efforts at a theory of economy look strange beside the theory which has gradually opened upon me. At Sydney I had by me Whately's *Logic*, but had never read it. I scarcely knew what logic meant. After a time, however, I read John Mill's *Logic*, which I perhaps partly understood; and yet, on the other hand, I admired Whewell's *Philosophy of the Inductive Sciences* which now (December 1862) seems nothing but fog.

"I conclude that I knew little or nothing about logic then, and never should have done but for the new exercise for my thoughts afforded in my second college course. It seems rather late in life to be learning what logic is, yet it is better late than never. It may prove that my visit to Australia, by breaking my college course and giving time to mature my powers, did peculiar service.

"I left Sydney with many exaggerated notions of my own powers and probable achievements. To spend a year in successful travelling over the Globe—perhaps publishing accounts of what I had seen when I got home—this was one of the things I thought worth my notice. I had thought myself so successful in writing flowery letters home, and my letters and papers were so freely printed in the colonial papers and magazines, that I entertained no doubt that it would be the same at home. Reviews and magazines were freely open to me if I cared to write, and if I found any difficulty in getting money other ways, to take to the newspaper profession seemed always open to me. I did not see that one kind of writing and thinking may be inconsistent with other kinds.

"*21st December* 1862.—I have had a good deal of dis-

appointment in the last six months, but now the shortest and darkest days are past; we may begin to hope for something better. In short, my plans are considerably altered, and as it now seems to me, improved. The notion of struggling on in London year after year until some sort of literary success should at last come is fairly given up. Harry Roscoe wants me to go as tutor to Owens College, where I may make £200, and I shall go if all can be favourably arranged.

"I do not find that my life, passed half at home, half at the Museum, is favourable in any respect. As I take up each new subject and get a few new facts about it, my interest and hopes rise so highly and suddenly that I can think of nothing else. Hence most exaggerated notions of what I can do with it. After working a few months at it very hard the interest of new discovery ceases, and the materials have to be worked up and finished. A breath of doubt and disgust seems to dispel the illusion, and I soon become as much depressed as I was before excited. This is just the history of my work at the subject of the volunteer system in England. I amassed a great quantity of amusing and new facts about the volunteers. In setting to work to write them out in a formal account, I soon grew disgusted."

To his brother Tom.

8 PORTEUS ROAD, *28th December* 1862.

"Boxing day was not a general field-day here, but our regiment was out at noon. There were not, however, more than 400 or 500 men. We marched in capital order from Westminster Hall to Hampstead. Arrived on the Heath, we commenced by storming Jack Straw's castle, which was taken in the twinkling of an eye. Refreshed by the plunder, we then extended over the Heath in skirmishing order. The place is perfect for the purpose, being covered with gorse bushes and gravel pits which serve for rifle pits. Our men skirmished rather wildly, and without a rigid observance of the field exercise-book. Still, it was a good lesson as regards the real purpose of light infantry movements. With the fineness of the day we got our spirits up, and we contributed greatly to the amusement of a numerous

crowd of people, who regarded us and our band with great favour.

"I rather like my sergeant's duties, which I am now beginning to exercise a little. I looked well after my section, one of the privates of which was Calder Marshall, R.A., the sculptor; but some of my men would get mixed up in other companies, and not even the sculptor had any clear idea of good cover.

"I think the popularity of the force increases. I must say I am interested when we are in Hyde Park, Wimbledon, Hampstead, or elsewhere, to think how often the same ground was covered by the old volunteers.

"You will be inquiring about my volunteer history. This has rather come to grief. For after almost completing the information necessary, I found I had not the light imaginative pen necessary for making a book popular in the present day. The history would have proved little more than a series of historical notes, yet it is a pity to let so many interesting facts go waste.

"I am at present going on with my old work of diagrams. I am now thinking of a small atlas with plates about 6 × 8 inches, from 1844-62, comprising monthly quotations of prices, exports, imports, etc., all fully reduced, analysed, etc., so as to make quite a small gem of a work—which cannot fail to be successful—and comprising the bank accounts as usefully as the large diagram. It is somewhat the same idea with which I just began nearly two years ago, but I have learnt so much by experience that my first diagrams are quite laughable beside the little gems I now produce. I have just begun drawing to-day a glorious one of the cotton trade, comprising prices of five kinds of cotton, also of yarn, twist, two kinds of cloth, with imports, exports, consumption, and stock of cotton. The atlas would contain perhaps twelve plates, including (1) bank accounts, (2) money market, stock market, corn of several kinds, agricultural produce, butcher's meat, the principal exports and imports, prices, etc., all the fluctuations during the year, and the seasons are to be fully worked out. A good deal of the work is done, but, of course, infinite labour will be necessary for finishing it satisfactorily.

In his journal, 31st December 1862, he writes:—"Still at the old work, and in rather better spirits. Yet I know I shall shortly be in as bad spirits as ever, these changes being regularly periodic with me. Harry Roscoe lately wanted me to go tutor to Owens College, and the prospect of more regular work and an income nearly made me give up all London plans. Lucy, however, sent a vigorous protest against it, which caused me to think twice, and I shall go on here for at least nine months.

"My atlas of monthly commercial statistics progresses satisfactorily, but my logical speculations give me most confidence. I cannot disbelieve, yet I can hardly believe, that in the principle of *sameness* I have found that which will reduce the whole theory of reasoning to one consistent lucid process. I can hardly confess to myself the value of such a work. Surely I ought not to want confidence in following my own plans out, regardless of the opinions of others, when I may expect such fruit from them. And yet how irksome is it to have everything in the future, nothing, comparatively in the present. Of late I have not been altogether wanting in exertions towards correcting some of my greatest failings. For many years I have had such a fear of speaking in public that even in reading in the college classes my voice shook. I regarded it as a physical impossibility. When I had papers to communicate to societies, I got Dr. Smith, or Harry, or Clifton, to read them, and slunk away myself out of danger. This seemed so very foolish and so serious a bar to my advancement, that I resolved to try to get over the difficulty by joining the college debating society. On the first night I said a word or two about some inconsiderable matter. I was named by the president to open the debate of the following meeting. Suspended between the desire to do the thing, and fear of incapability, I at last doubtingly consented, prepared a speech, and did not appear when I had engaged, to the disgust of the society. I willingly paid the fine and bore some little censure and ridicule, and did not give the matter up. In the last few months I have been a pretty frequent attendant, making brief remarks, and undertaking, on one occasion, to reply. That I can ever be a good speaker is altogether beyond hope—but to be

able to read with self-possession is almost sufficient for any position I am likely to have, and this I shall no doubt be soon able to do. I am even engaged in getting up a literary and scientific society at college for the reading of original papers, in which I shall be much more at my ease.[1] In all public life such as I have at college, in the rifle corps, in society, I feel a constant unreadiness of thought, a want of tact, of practice, of quickness, which puts me in awkward positions, saying and doing things which cause no little subsequent regret. I have especially an incapacity of remembering people and their names, which is very troublesome. And yet if these are the accompaniments of superior power in other ways, I should put up with them contentedly, and not be too thin skinned.

"The year of which only five minutes have now to run seems to have been a long one. It has seen many of my hopes fulfilled, many frustrated. It has made me an M.A. It has seen my theory of economy offered to a learned society (?) and received without a word of interest or belief. It has convinced me that success in my line of endeavour is even a slower achievement than I thought. This year has taken much youthfulness out of me.

"It is often a cause of regret to me that my pursuits and my utter want of influence in society prevent me giving any assistance to others, even my own sisters and brothers.

"1*st January* 1863.—How gladly would I brighten their lives—how could I enjoy a pleasant house, a well-filled purse, a power of aiding and pleasing others each hour of the day. What would I not give to inspire Herbert again with that energy and hope which alone can make this life tolerable! How I fear that he has lost them for ever—and that Australia promises to him little more than Minnesota! How gladly would I return Henny's forgetfulness of self and constant devotion to the good of others by such return as could be made, instead of keeping her in an uncomfortable lodging

[1] The formation of a literary and philosophical Society amongst the students was suggested to Mr. Jevons by his friend and fellow-student, Mr. Philip Magnus, who tells me that Mr. Jevons was chosen as president of the new society, and that he contributed a paper on the value of gold, prior to the publication of his "A Serious Fall in the Value of Gold." This paper was published in a volume of the transactions of the society.

and in uncertainty! But all this, it seems, I must suffer and regret in quiet, and with but faint hope that I shall be justified by the result.

"During the year now begun I hope that I may not falter and distrust even my highest hopes of doing good in my own peculiar way. In action, social influence, etc., I am nothing—never shall be of the slightest consequence. In many kinds of mental influence I am nothing—no imagination—an imperfect memory, no classical or mathematical scholar, a heavy writer. I have but one slight thread of hope, a capacity of seeing the sameness and difference of things, which, if history and the sayings of experienced men are to be believed, is a rare and valuable kind of power. Let me set the single purpose before me of developing and properly using it, not pretending to what I am not and cannot be, in order that I may be what others seem incapable of being.

"A week or two ago, when Harry Roscoe proposed my going to Manchester, I took a violent dislike to the Museum, and thought my escape from it would prove a turning-point in my life. Now I am again nearly caught in the toils of literary dissipation. I intend fairly to try my plan of literary agency, although I am somewhat ashamed of it. To send circulars and hire out one's time at three shillings per hour seems rather *infra dig.*, but perhaps it is false pride, and I ought not to stick at anything short of moral wrong."

CHAPTER VI.

1863–1866.

To his brother Herbert.

8 PORTEUS ROAD, *18th January* 1863.

"WE unfortunately missed the last mail, from not thinking of it at the right moment—perhaps because Christmas was coming upon us. . . . Whether you get on well or ill, I should be sorry to think of your always remaining away. In some years to come I hope we may all be better placed. But what every one, and yourself, of course, included, wants, is not so much comfortable living as a satisfactory occupation—in short—work, and that is even more difficult to get sometimes than anything else. If you could make yourself interested in work, whatever it be, and go through with it successfully, that, according to philosophers from Aristotle downwards, is happiness. I believe he is right, and that happiness is inseparable from exertion, and is, in fact, hopeful exertion. This is in direct contradiction to your doctrine, which excludes exertion altogether, and lets things take their course.

"I am still *in statu quo ante* in London. I am trying the scheme of agency at the Museum, but as yet have only had one job, and that not of the right sort. I am much inclined to fear it will not do. It is regarded as too dubious and irregular an occupation, as is apparent from the notes of the few who have applied to me; to say the truth, I am not so much set as I was upon remaining in London. Its principal advantage is access to the Museum—but this rather misleads one into trivial subjects, and I should, perhaps, do better with fewer books.

"At Christmas Harry Roscoe proposed my going as tutor to Owens College, where I might make perhaps £200 a year. I put the matter off till the beginning of next session in October, when, if nothing better occurs in the meantime, I shall probably go. 'Half a loaf is better than no bread,' as they say; and I am not afraid that, because I begin with a rather humble place, I shall never get a better. I require some years of quiet work to bring out my theories in at all a presentable form, and I must have a means of living in the meantime. And if I do not get on so fast in worldly ways, I am quite satisfied with my own theories, which ever become clearer and more perfect.

"The diagrams, after all, have not lost me much money, as they will pay back more than £20 of what I spent on them. Since you left they were praised in the *Exchange Magazine* —the editor of which has a fancy for diagrams. They were just mentioned in a *Times* money article, and also in the *Economist*, and by these *opinions*, sent in a fresh circular, I continued to sell a good many more of them, and Stanford has sold altogether nearly two hundred, and at Liverpool three dozen were sold. I have been encouraged therefore to prepare a new set of small diagrams, to form a small atlas, and give numbers of prices, etc., for the several months of 1844-62. They are getting on pretty well, and will, I think, succeed. In the meantime I have been led to observe the great rise in prices of nearly all things since 1851, which is obviously due to a fall in the value of gold. This I am now trying to ascertain and prove in a conclusive manner, which will, of course, be a very important and startling fact. Supposing it to be proved, I do not yet know whether to publish it with my atlas or separately."

Mr. Jevons had thought of the scheme of a Literary Agency to which he refers as a possible means of earning sufficient income to enable him to remain in London and pursue his own researches in the British Museum Library. He offered to undertake researches on any subject for persons who might be prevented by want of time or distance from the Museum from undertaking the work for themselves.

The investigations on the fall of the value of gold to

which he refers, proved to be of even more importance than he expected, and the early part of 1863 was devoted to the preparation of his tract, *A Serious Fall in the value of Gold, and its Social Effects set Forth*, which was published before the end of April. This little book, although at first it remained unnoticed, proved to be an unhoped-for success, for it attracted considerable attention in the autumn of 1863, and at once gave him a place amongst the rising economists of the day.

To his brother Herbert.

8 PORTEUS ROAD, 19*th February* 1863.

". . . We are at present in London as for the last few years, but I am convinced I must get some more regular occupation as soon as possible. . . . The notion of living in Manchester is not altogether an agreeable one; but I think it will be a step in the right direction. After some experience in teaching, and by degrees in lecturing, I shall be more ready to offer myself for any professorship that may happen—perhaps one at Owens College itself. There is no doubt, I think, that the professorial line is the one for me to take. I have given up all notion, for the present, of hack-writing, as it seems to me it must be destructive of any true thinking, and, unless to a person with a very ready and popular style, must be an occupation full of hardship and disappointment."

To his sister Lucy.

43 RICHMOND GROVE, MANCHESTER,
20*th April* 1863.

"I don't know whether I informed you that I was coming here to arrange or consider the tutorship affair.

". . . On Sunday afternoon Mr. Greenwood, Harry, Alfred Booth, and myself went a walk, in the course of which I talked the matter over with Mr. Greenwood. I have also gone into it pretty fully with Harry, and also with Professor Clifton, who has been very friendly.

"Although there are, of course, many things to deter one from coming here, it becomes more and more obvious that it will, on the whole, be greatly to my advantage to come.

"It is *quite possible* that I may make £200 the first session—at least probable I shall make £150, and there can be no doubt I shall make over a hundred at any rate.

"Considering the less cost of houses and living, my income would in any case be equal to or greater than my expenditure. The teaching work may be considered drudgery, but it is a very proper preliminary to a better place, and such as almost all go through in the larger universities before getting to a professor's chair. Even Mr. Greenwood hinted that in the course of a few years I might fairly look forward to a professorship in Owens College.

"And then I find that Manchester, although smoky, has still a distinguished literary position. I should see a great deal more of good society than I should in London, living there for a quarter of a century.

"I have not lived twenty-eight years without being aware that, independent of any inward merits, there is a certain position necessary to make one known and recognised. This I have a far better chance of getting here than in London. . . . It is also not to be forgotten that the college is a very rising one, and although decidedly a shabby one at present, may grow, and in future and more prosperous years will probably be rebuilt, and rendered very important. I have been to-day to see the Cheetham Library, of which I had heard not a little. I find it to be one of the most delightful old libraries I could conceive to exist, apparently hardly touched since the Middle Ages came to an end. Nor is it the only good library here.

"My work here would consist in teaching small classes of six or eight students for some two or three hours per day, as well as giving my general assistance. I might also have, if I liked, some of the evening classes, attended by men from the town, which are at present taken by the professors or by other teachers, the profits of which would amount to some fifteen shillings each evening, or £15 per course. And it seems I might almost have a *carte blanche* to form courses of logic or political economy for these evening lectures—if students presented themselves in sufficient numbers. I should of course have some difficulty in beginning to teach, but it must be met sooner or later, and

there cannot well be a better opportunity for practice. On all these accounts I am inclined to come here, the only contrary inclinations arising from the dull nature of the town, and the regret in leaving London and the Museum. I have been much more inclined to the scheme since I found that Mr. Greenwood's explanations of the subject were even more favourable than Harry's. You may, then, I think, conclude that I shall to-morrow agree with Mr. Greenwood about it, and the minor arrangements may then be considered matter of course."

In his journal he writes:—

"*25th April* 1863.—For several months before Christmas I was often in low spirits. Since Christmas I have hitherto felt buoyant in spite of every apparent obstacle. Now that I have returned from Manchester with a reasonable prospect of a comfortable living I find myself again falling into dejection. High hopes must, it seems, be succeeded by the opposite. It is peculiar, too, that as long as I am going on with my work I am happy; when it is done I collapse, hate my work, and, feeling my best efforts useless, life seems useless and better away. This is no doubt unreasonable, but how avoid it? Now, I suppose I am low because my essay on 'Gold' is out, and as yet no one has said a word in its favour except my sister, who of course does it as a sister. What if all I do or can do were to be received so? In the first place, one might be led to doubt whether all one's convictions concerning oneself were not mere delusions. Secondly, one might at last learn that even the best productions may never be caught by the breath of popular approval and praise. It would take infinite time and space to write all I have thought about my position lately. As I have even thought myself in many ways a fool, I am in no way surprised to find that many notions which I have had are ridiculous. At last I fairly allow that the one great way of getting on in this world is to get friends, and impress them with a notion of your cleverness. Send them about to advertise your cleverness, get their testimonials like so many levers to force yourself where you wish to go. How well did Shakespeare see through all these things when he wrote his sixty-sixth sonnet.

"It is quite obvious to me that it is useless to go on printing works which cost great labour, much money, and are scarcely noticed by any soul. I must begin life again, and by another way, ingratiating myself where and when I can: only after long years of slow progress can one's notions be brought out with any chance of being even examined by those capable of judging of them.

"Faulty as I am in so many ways, I yet feel that my inmost motives are hardly selfish. I believe they grow by degrees less so. Sometimes I even feel that I should not care for reputation, wealth, comfort, or even life itself, if I could feel that all my efforts were not without their use. Could I do it all anonymously I perhaps might consent to it. And yet the condemnation of friends and all you meet is hard to be borne, and their praise or admiration must be sweet.

"I am convinced that at any rate it is best to clear out of London. I make no progress here—quite the opposite; I may do better elsewhere. I must go upon a different tack."

To his sister Lucy.

8 PORTEUS ROAD, 11*th May* 1863.

". . . To-morrow I am going to take my seat in convention, and deliberate as to whether women are to be admitted into our university. As yet I have hardly decided how to vote; but I begin to feel quite senatorial, having received tracts urging a little favour to the other sex.

"The next day is the presentation, when I hope to get my medal, having waited for it long enough."

On the 13th May 1863 he received the degree of M.A. and his gold medal at Burlington House, and two days afterwards he wrote to his brother Tom:—"I am now a veritable M.A., having been presented to Granville. I have also got my medal, which is a good heavy lump of bullion: it sorely tempts me as a professed gold assayer to try what metal it is made of. If nothing happens to it you shall see it some day.

"I am in rather good spirits, as my logical system is at last clear from farther doubt. It is the same as Boole's in some ways, but free from all his false mathematical dress,

which I show to be not only unnecessary but actually erroneous, and only giving true results by a kind of compromise really reducing it to my form. On the other hand, my methods reduce the most complicated sets of propositions with great ease and *intuitively*. From one set, for instance, of three propositions involving say five or six different terms, I can easily deduce as many other propositions containing relations between those terms. There would be many hundred propositions between five or six terms. Boole can get these relations, but only by laboriously working out each case by mathematical processes. The Aristotelian logicians might perhaps deduce one or two of the results with difficulty. The essential part of my method, however, is to show that the proposition is really an equation analogous in most of its properties to an equation in quantity. Boole has confused the equation of quality and the equation of quantity together, and all the wild complexities of De Morgan and other logicians arise from confusing quality and quantity. My doctrine is that there is no quantity at all in logic. All terms are really universal, as Boole shows indeed, but then Boole spoils his system by introducing 1 and 0, and various symbols whose meaning is really derived from logic not contained in it."

On first leaving London Mr. Jevons proposed to spend a few weeks with his brother Tom in lodgings in the Wirral of Cheshire; and on the 15th May he wrote to him as follows:—

"The chief thing is *perfect quietness* for me to work during the day. If you could get a solitary cottage on the sandhills it would do admirably. But there must be neither children nor cocks and hens near it. If near the sea, all the better. I don't object to the noise of the waves. A good walk to the ferry early every morning will do you good. We will get up at daybreak and bathe before breakfast, and all that sort of thing."

To his brother Herbert.

8 PORTEUS ROAD, 19*th May* 1863.

"As the mail day is nearly come again, I must tell you what little there is to interest you. I am still in London,

but closing up my affairs here, and in a week more I expect to leave here for good.

"London is very lively just at this time of year, and there are various meetings, rifle affairs, and so forth, which detain one, but I am very anxious to have some time in the country this summer before going to Manchester. I am arranging with Tom that we shall go into lodgings together at Wallasey,[1] where he is in treaty for a couple of rooms.

"I shall stay there a month or six weeks, and then spend the rest of the four months at Beaumaris, or any part where Lucy may be.

"My arrangements with Mr. Greenwood, the principal of Owens College, are that I shall go there in October if some twenty or twenty-five pupils offer to pay three guineas each for the session. There is little doubt, he thinks, that some thirty will offer, giving me £100 to begin with. There is also an evening class for logic which I am to have, but which will not pay more than a few pounds. Private teaching must make up the rest. For the second session, if I desire it, I may probably have elementary evening classes of Latin and Greek, which pay more; it must, however, be chiefly left to experience to show how much I shall do there.

"Our literary and philosophical society at college, of which I am president, seems to have a long future before it. At first many of the older students held aloof from it, and predicted its ill success, but a few dull meetings having been survived, many of the old students, including distinguished graduates, are joining, and many of the papers are interesting. This day week we are to have a strong meeting, at which a professor will preside.

"Rifle matters are in a very favourable position. The force on the average is scarcely less than it was, and is probably better trained and managed. Our corps in their inspection last Saturday brought up 908 men of all ranks, which is more than they presented last year by 15 per cent, and most of the manœuvres were fairly done. Parliament have not only voted additional allowances of money to support

[1] In the Wirral of Cheshire. They stayed afterwards at Leasowe in the same neighbourhood.

the corps, but have readily passed a new Act consolidating the law and giving various facilities and regulations tending to make the institution permanent—and it is now regarded as such on all hands.

"I shall be sorry to leave my corps, the Queen's, but I shall be sure to join a Manchester corps if I remain there any time.

"I am forwarding some copies of my pamphlet on the value of gold to Miller, and he will, I hope, send one or two on to you. It has as yet sold very badly, and has not been noticed by more than one or two papers. R. Hutton has given me an article, or part of an article, and warmly adopts my view of the question. I have had acknowledgments of copies which I sent to various persons; among whom Mr. Newmarch, the chief authority on the opposite side of the question, does not agree to all my conclusions, but says he has carefully read the whole, and seems to regard it favourably. I also have a brief acknowledgment in the handwriting of Gladstone, who is now regarded as the leading man in the country.

"I shall not, I think, go on with these statistical matters much at present; but I have plenty of other work going on, and, besides, have to prepare for my college work at Manchester."

To his sister Lucy.

WALLASEY, 31*st May* 1863.

"I am at last out of London, and find the quiet of the country delightful. Our lodgings are just on the edge of the sandhills, and I shall never be tired of wandering on to the open shore. In the morning, too, we bathe with great convenience. . . .

"I pretty well closed up my London business, and went to a few exhibitions, theatres, etc., before leaving the gay world. I have brought abundance of books here, and am looking forward to some quiet work, chiefly in preparation for October. . . .

"We went to church this morning! There was a good musical service, which was as pleasant as could be expected, considering I was at Westminster Abbey last Sunday, where the organ-playing is perfection itself.

"Just before leaving London I had a pleasing letter from Professor Cairnes, a political economist, who is thought a good deal of now, thanking me for a copy of the pamphlet, which he said strongly confirmed some conclusions of his own, arrived at in a different manner, and published in various essays in 1859 and 1860. He says he has written a letter to the *Economist*, drawing attention to the fact. This will probably sell many a copy for me, and perhaps induce Mr. Bagehot to take the subject up in the paper, as I have already heard he was reading the pamphlet."

To his brother Herbert.

LEASOWE HOTEL, 22*d June* 1863.

". . . I have brought plenty of books with me, and spend nearly the whole day, from 9 A.M. to 6 P.M., in logical and other work; then we have tea, and stroll in the evening, going early to bed. I find the quiet of the country extremely delightful after so long living in the noise of London. But the long days of unbroken solitude and work are apt to become very tedious unless I now and then have a change. Most days, indeed, I get a bathe, which freshens me up, and occasionally I go to Liverpool.

"I am engaged partly in practising up my mathematics, Greek, and Latin, for my tutoring work at Manchester; but just at present I am chiefly working at my logical system. It has only of late taken a definite form, but I have been more or less at work upon it for some two years. I think I shall have a paper ready in the course of a few weeks, of a very complete character, but I am afraid it will be hard to get it accepted, because there are not half a dozen men who, as far as I know, occupy themselves with logical speculation, and these are too much occupied with their own systems to tolerate an antagonist one. . . .

"I feel rather relieved at having got away from London. It is an inhospitable place, and, as I was placed, made my life rather dreary. It got worse the longer I stayed. As yet I do not miss the Museum library, for I have far more books with me in a single trunk than I can read, and the library is only useful now and then to look up out-of-the-way books. A large library almost prevents thorough

reading. There are two at Manchester besides the Free Public Library, and various half public ones, the fine old Cheetham Library, where I have no doubt I shall spend much of my time."

To his brother Herbert.

LOW NEWTON,
NEWTON IN CARTMEL, LANCASHIRE,
19*th July* 1863.

"I am now staying with John and Lucy at their country lodgings here. This place is close to the Lakes, the lower end of Windermere being about four miles off, and the country is very pretty and full of good walks, although by no means so mountainous as it seems to be a few miles farther north. I have two rooms here of my own, where I do my work in quiet most of the day, and in the evenings we usually go a walk.

"I have as yet been here only some four days. Previously I continued with Tom at Leasowe, where we had a quiet but pleasant time of it.

"*Monday, 20th July.*—Last evening Lucy and John and I went to Cartmel to the old Abbey Church, a rude but ancient piece of architecture, with some tombs and curiosities, which I saw after the service. Excepting walks of a few miles with John, I have not yet seen much, nor do I intend to go about very much. I have plenty of work to do at home, and am more inclined to take the country easily.

". . . I am having the first long period of country life which I have yet enjoyed. Unless Sydney could be called country, I may say that I was never before living in the country for any long period. I find it excellently agreeable, both for mind and body, for work and play. I think I should like to live altogether in quiet country, with only occasional sights of the town; but as *it is*, I am only getting my spirit up for a long residence and plenty of work in Manchester, one of the worst of towns. Yet I think my position will be far more cheerful than it was of late in London, with large outgoings and no incomings, and all my time upon my hands for good or bad. During my first

Manchester session I shall have some difficulty in practising teaching, and learning and keeping up with all the necessary work. In following sessions my work will be more familiar and easy, being partly the same over again. My college work will only occupy three hours for five days per week, independent of certain evening classes, and there are three months' clear vacation. I shall thus have plenty of time to go on with my own work."

To his brother Herbert.

NEWTON IN CARTMEL, LANCASHIRE,
24th July 1863.

"Since posting my letter through Tom's hands we have got your first letter from Nelson, and we all greatly rejoice in its cheerful character.

"It seems to me that a *warmer England* is what any one might desire for his adopted country. I hope that you may be able to stay at the Nelson side, by a good development of the diggings there. The Otago country, I should imagine, is somewhat wilder and more inclement. In any case I don't think the bank and you will wish to part for the present, and the longer you stay the more will be your salary.

"Your photograph, taken by my old photographic friends the Freemans, has given great satisfaction here. It is really well done. It seems also to show that the voyage, the southern climate, or something else, have made you look fatter and better in a great degree.

I have just received the bill for my pamphlet on Gold. The total cost of printing, advertising, etc., is £43, and the offset by sales only £10: only seventy-four copies seem to have been sold as yet, which is a singularly small number. "On the other hand, my diagrams still continue to sell, thirty copies having been sold by Stanford during the last half year, so that only ten of the 'English funds' now remain in their hands. This sale returns me some £3 : 10s. The superior success of the funds over the bank diagram makes me think that a single diagram well fitted for an office, and rather less costly than either of these, might sell well. By getting these diagrams spread about it spreads

one's name, and might enable me at a future time to publish larger works successfully."

To his brother Herbert.

BEAUMARIS, 23*d August* 1863.

"Our long-contemplated visit to Beaumaris is at last begun, and Henny and I are very agreeably settled here in a small house of our own, expecting Tom to join us at the beginning of September. You will be surprised at hearing *a house of our own*, but Lucy has managed very cleverly, as she usually does in these matters, to find a small house which was to let for the required period. We have only as yet been about four days here, but our visit promises to be a very pleasant one, as well as favourable to my work. I have indeed only a small bedroom to do my work in, but it is pretty quiet; and the cheerful life of Beaumaris, with daily visits to Lucy's house, will tend to relieve the tedium of working at home. . . .

"Your letter is a great satisfaction to all of us. It makes us feel that the star of our family has passed its Nadir and is rising. We have none of us yet attained any permanent success or place in society; but I hope that in time we shall all have it. Some people may have thought that we had a wrongness in us which made us continually refuse the goods the gods provide us, and you and I especially may seem to have done so; but I trust we shall both be soon well enough off, even in the way society takes the meaning of this. I have no fear but that Tom will find a place suitable and profitable in due time, because his more peculiar qualities are so well tempered by sociability and sense. . . .

"My own affairs are *in statu quo ante*. I am still reading up subjects for my tutoring, and writing a set of forty lectures on logic and political economy for my evening lessons. The latter is no light job, and I cannot finish them quite before the session begins. Nor can I do more than make them up roughly with great aid and copious extracts from books. It would require several years' practice in lecturing, and plenty of labour, to form a good set of lectures; but this of course is not to be expected in a mere evening class.

"My work will at first be very novel and hard to me, and most inadequately paid; but it would be absurd to despise a small beginning. In fact, I could hardly venture to take a professorship, if I could get one, without some previous practice in lecturing. I have all my life had the strongest possible horror of public speaking, and I used to think myself absolutely incapable of it. But the last session at college I found it not impossible, and, after getting over a few failures and breakdowns, I have no longer an insuperable objection to it. After the practice which teaching will give me, I think I may become quite expert at it, and perhaps the fonder of it as I formerly so much disliked it. . . . I am inclined to think I only need practice myself to make a lecturer, though I should never make a rhetorical speaker or debater, the two things being quite distinct. It is a well-known fact that there is nothing to which practice is more essential than public speaking.

"Since my last I have finished my first paper on logic and sent it to De Morgan, who agreed to read it and give me some opinion on it. But he has not yet had it long, and has not yet sent any answer. I have written on the subject to Professor Boole, on whose logical system mine is an improvement. In his answer he does not explain away an objection I had raised against his system. He seems to think that my paper probably does not contain more than he himself knows, this being a common failing of philosophers and others; but still he tells me very civilly that if I think still that there is anything new in my paper I ought to publish, which of course I shall do one way or another before long."

To his brother Tom.

BEAUMARIS, 30*th August* 1863.

". . . I have just thought of a point which will remove a difficulty in the *Primary Logic*. I said there that every term *means* one or more qualities, known or unknown. I now see that every term must mean an indefinite, or rather infinite, collection of qualities of which only one is necessarily known—viz., the fact of being indicated by a certain sign, and of the rest some may or may not be known. It

is obvious, in short, that *anything* either must or must not have any property that you like to name.

"Every term also taken *in extent* must be considered infinite, for we can never tell how many things may exist of any kind in this world, or in other worlds, to which universal truths must extend *ad infinitum.* The only possible definition which is not unlimited is that of things within your feeling at a time, as *this pen, this point, this world.*"

During the summer Mr. Jevons devoted much thought to his logical system, and the results appeared in the small volume, *Pure Logic, or the Logic of Quality apart from Quantity*, which he wrote chiefly during his stay in the country, and which was published at the beginning of 1864. In the Preface he thus describes the purpose of the book:—"My present task is to show that *all, and more than all, the ordinary processes of logic may be combined in a system founded on comparison of quality only, without reference to logical quantity.* Before proceeding I have to acknowledge that in a considerable degree this system is founded on that of Professor Boole, as stated in his admirable and highly original *Mathematical Analysis of Logic.* The forms of my system may, in fact, be reached by divesting his system of a mathematical dress which, to say the least, is not essential to it. The system being restored to its proper simplicity, it may be inferred, not that logic is a part of mathematics, as is almost implied in Professor Boole's writings, but that the mathematics are rather derivatives of logic."

To his brother Herbert.

BEAUMARIS, 15*th September* 1863.

". . . I have myself been rather in luck lately concerning the pamphlet on Gold. Mr. Fawcett, a blind M.A. of Cambridge, to whom I sent my pamphlet, he having written on the subject before, was convinced by my figures, and delivered an address on the subject to the British Association lately, quoting my figures. The *Times* reported his speech, and took the subject up in *a leader*, also quoting me, and then there followed a discussion of the subject in many letters, as well as articles in other papers. Professor Cairnes also again wrote on the subject to the *Times*, and almost

challenged people to disprove the conclusions of my pamphlet. Lastly, the *Economist* has been induced to notice the subject in a cautious manner, and, though attributing to me some exaggeration of the matter, comes over to my conclusion substantially. Thus it may almost be considered that the matter is settled as regards a certain depreciation. All that the papers admit, however, is the lowest possible estimate of 10 per cent, whereas, though this is the result given by my tables, as it happens, I believe the real depreciation to be nearer 20 per cent.

"In the last few days I have been thinking of applying the method of my pamphlet to prices extending some centuries back—in fact, of trying to determine the general variation of prices from the earliest times of English history for which any data exist. The result, consisting in a simple curve of the value of gold, would be one of the most important and interesting statistical conclusions that could be got. The method I should use would enable me to bring into one general induction the most scattered and various data of prices, which are of little or no use for any other purpose. If I could get such an inquiry done in two or three years when prices are again rising and attention is drawn to the continued depreciation, the publication would be probably very successful. I have already so much work upon my hands that such a serious addition is no joke. I think, however, it is well, having had a first success in this subject, to draw that line well, and it is one in which a name is rather easily made. I am better in theory than I am in fact; but theorists have a bad odour until their soundness is established by the slowest possible process. Hence it is a good thing to begin by diagrams, tables of prices, and such things, so that you can never be charged with arguing without a reference to or knowledge of facts.

"I am now within about two weeks of the time when I must set out on my Manchester business. I have been engaged lately in writing lectures on logic and political economy—a rather dreary occupation—and in working up some subjects for my tutoring. At first my work will be by no means easy, but perhaps the same might be said of any other new occupation. I think it probable that I shall

not desire to take additional private pupils to any great extent, but rather to use my spare time on private work, which will ultimately make a better return."

Before the end of September Mr. Jevons went to Manchester to be ready for his new duties at Owens College. His younger sister decided to accompany him there, and, as a temporary arrangement, they took a house with Mrs. Henry Roscoe, the aunt whom Mr. Jevons had previously lived with during his first college days in London. This house, No. 9 Birch Grove, Rusholme, was Mr. Jevons' home until the time of his marriage. Mr. Jevons' own letters sufficiently explain his duties. Now that Owens College has a whole staff of lecturers to aid the professors, it is difficult to realise that little more than twenty years ago it was only as an experiment that one tutor was appointed. He was to be prepared to aid the students in any of the branches of knowledge then taught at the college, and Mr. Jevons soon found that the variety of subjects entailed great labour for a very inadequate reward. If he could have been content to lay aside his private work, it might not have been too much for him, but, as it was, the attempt to do both by degrees injured his health, and he never wholly recovered from the effects of the strain upon it.

Mr. Herbert Jevons now had an appointment at a bank in New Zealand, and, having to undertake assaying, he had written to his brother asking some questions about the best way of doing it. Mr. Jevons replied in a long letter, dated "Owens College, 19th November 1863," minutely detailing the process. He then adds:—

". . . I have written at such length that I have not time to speak of my own affairs.

"I am rather busily engaged between my college work and private work. I get on pretty well with lecturing, having six lectures in the week, the classes varying in number from nine up to more than twenty. The preparation of the lectures, the correction of exercises, etc., takes up a good deal of time. But I feel that it is my vocation; that, in fact, though I may seem to make slow progress, I am in the right line. I have, I think, on the whole done

better in the four years I have as yet been at home than I could have expected."

In his journal he writes :—

"*9th January* 1864.—Though still capable of taking a very gloomy view of affairs, there is much on which I may congratulate myself. My first college term has convinced me that I can be a lecturer—a passable one, if not a good one. The intolerable fear and weakness, that of public speaking, is removed from my way. Moreover, my pamphlet on the gold question has had a degree of success that must surely be allowed to be beyond my highest hopes.

"I often debate with myself, and have cause to debate, whether it is better to lead a solitary, laborious life given up wholly to study and writing, or whether it is not better to do as others do—involve myself in the pleasures of society and of a family, and trust still to find time and opportunity sufficient to my other work. There are many instances of the highest men who have remained unmarried, and two of them, Locke and Newton, are the very two that one might take as almost perfect examples. But Locke, if never married, was yet a man of great social powers, and far from being the morose awkward creature to which I have a great tendency. Newton, again, though he led a close college life for a long time, was probably not the better for it. It seems very likely that he rather overworked himself, and injured his mind, and he indubitably wasted a great part of his vast labours. Should we not be always striving to correct our worst faults, our weak parts? We should not, indeed, place ourselves in a position where these faults may do us special harm, but, if possible, let us place ourselves where they may be corrected as far as possible. Then our better parts may be almost left to develop themselves.

"I begin to think that I am too much wrapped up in my own thoughts and prospects; too constantly dwelling upon, congratulating myself on, my own supposed excellencies. This cannot be good. I should get quite as much work done without thinking so much about it. And if I had some one to love and care for, no real interference with my other work need be apprehended."

To his sister Lucy.

BIRCH GROVE, RUSHOLME,
10*th January* 1864.

". . . I enclose a letter of Tom's, mentioning a review of my pamphlet among other works, which is quite as satisfactory as he says. It also speaks of me as being master of every part of the subject. You will also, perhaps, like to hear, and I only tell you because I know you will like to hear, that my pamphlet was mentioned in a report by one of the English delegates to the International Statistical Congress at Berlin on the progress of Statistical Science in England as in a certain degree a novelty. Altogether the pamphlet has had an extraordinary degree of success, but it brings no money, and I don't seem likely to get money anywhere.

"I have a note from De. Morgan pointing out a slight mistake in my logic, but saying he likes it well at first sight. He evidently takes some interest in it.

"I find it somewhat dull and discouraging beginning here again after our cheerful time at Beaumaris. I think I shall need a holiday again at Easter with you if it can be managed, but it is rather soon to begin thinking about it."

To his brother Herbert.

18*th February* 1864.

". . . I have not much to tell you about my own affairs. I shall make this year nearly £100 from the college. Railway dividends also are improved up to six per cent, so that I shall have an income of about £170, which fully covers expenses. My work takes up a good deal of my time, but after Easter the evening classes cease. I am going on with various work. I am nearly completing the full reduction of prices since 1782, which will show many things of interest, I think. I am also about to undertake the subject of the exhaustion of coal in England, which I believe is a very serious matter; a good publication on the subject would draw a good deal of attention. I am convinced that it is necessary, for the present at any rate, to write on popular subjects. My logic has made no noise, although it is

somewhat favourably regarded by De Morgan, Professor Sandeman here, and others who know what logic is or should be."

At Easter Mr. Jevons went for a short walking tour in Derbyshire with his brother Tom. In the following letter he refers to a visit he had made there with his parents and elder brothers and sister in the year 1844 or 1845.

To his sister Lucy.

ROWSLEY, DERBY,
26th March 1864.

"Tom has written you an account of our proceedings, but I wish to tell you how far I find my recollections of our visit, nearly twenty years ago, are carried out. We found Castleton and the Peak Cavern and Peveril's Castle very interesting, and Little John's tomb at Hathersage was a thing to be seen. The first part I could remember seeing was Middleton Dale, descending among picturesque limestone cliffs. I think we must have driven down there, and there was pointed out, I think, a cave where a murdered person had been hidden. We got a lift in a car for a few miles to Baslow to save time. I at once recognised the hotel where we lodged—a new comfortable place, though I had lost all thought of it. The stream was close by where I remember Herbert and I paddled about and were amused by the ducks. I looked for the cottage up a little hill where Uncle Hornblower lodged, and found it at once.

"Chatsworth seemed quite familiar to me, and no part more so than Queen Mary's Bower, a kind of small garden enclosed in a moat. We did not care to see the inside of Chatsworth, but pushed on for Haddon Hall, getting, however, a beautiful view of the park and palace and river and all from a hill in the distance. Edensor seemed familiar to me.

"At Haddon Hall I recognised the doorstep worn through by persons stepping in and out,—a fact which had immensely impressed me years ago. The most of the interior of the Hall seemed new to me, but almost larger and more interesting than I had supposed. The gardens, on the contrary, were smaller than I expected. The view of the

Hall and of the valley altogether from a little distance was quite new to me, and is one of the most pleasing views I have ever seen. You must know that Haddon Hall is the subject of the only piece of poetry I ever wrote, namely, soon after our visit, and I can yet remember being disappointed because you did not seem to think much of my verses, which was, no doubt, a very salutary thing for me.

"I find I have not the slightest recollection of most parts of the road we must have passed, but only of remarkable objects here and there. I shall look out at Matlock for the large hotel where I was lost among the passages, and the fountain that Herbert turned off and on to our great surprise, and the cliffs on the other side of the river.

"We have been much favoured by the weather as yet, and I feel immensely benefited by our two days."

To his brother Herbert.

BEAUMARIS, 18*th May* 1864.

"I omitted to write last month, being much occupied. I am here for a week's holiday at Whitsun. week, during which our college is closed. It happens to be a period of splendid hot summer weather thus early in the year. The sun is so hot here that we can hardly go out in the middle of the day, and the season as yet has been such that the trees and all vegetation are growing with the utmost luxuriance.

"As the tide happens to suit well, I get up before breakfast and have a delightful bathe, all the better perhaps because from the coldness of the water it must be brief, and I sometimes have a second bathe towards evening.

"By the end of the week I think I shall be almost recovered from the fatigue of my first college session. I have now only two weeks more at college, and after that intend to go up to London for some weeks of my vacation. In spite of my ill success this year I am inclined to think I shall succeed better next session, and shall find it much easier and pleasanter work. In that case I might make an income of some £200 to £250 over all, and might begin to think of taking a house of my own. I have at times overworked myself during the past session, and always feel it in

subsequent depression; but I try to work to the best advantage, by giving up night work and taking plenty of sleep, and occasional holidays, and I hope thus to get through the whole of the summer, and do a great deal of reading in connection with the question of the exhaustion of coal, which I look upon as the coming question. At the same time I am going on with the gold question, and only slightly deferring further logical work."

In his journal he writes:—

"23*d May* 1864.—Yesterday I walked with Tom and Will Jevons from St. Michael's Hamlet to Allerton and the neighbourhood. We walked in the fields near the Hall, and in every way it was an hour of pleasant feeling to me. I could not but reflect upon those from whom I come. I could not but feel the hope that I may do my duty and use my powers as well, and I was filled with the beauty and cheerfulness of the scene around. . . .

"4*th June* 1864.—This day the working session ends at Owens College, and as I have nothing to do with the examinations, my college work is at an end. I shall stay, however, another week in Manchester, having to give three lessons to a pupil, Captain B——, to get some price diagrams drawn for the British Association, and to wind up my affairs for the session.

"I have for at least a month now been in good, and, what is more, equable spirits. As the session drew to an end, the intense discouragement my work often gave me was lightened. Having sent in a report and proposals which were approved by the professors, I have a reasonable prospect of better success next year. Convinced that I received great detriment from my want of sociability, I resolved to do what was possible to throw it off. It was, indeed, like resolving to throw off nature itself and become somebody else, so habituated have I long been to shyness, retirement, and consequent awkwardness in all strange society. Even now, no doubt, I must not hope to become more than in an average degree social. A long existing fault can hardly be changed by any exertions into its corresponding excellence; but I think it quite possible that the fault itself can be removed, and that is a great thing. I could hardly have

hoped so much had I not in a previous instance achieved a like manner of success. I have learned to speak with some composure in public,—a thing which for many years seemed beyond the bounds of possibility. Few could form any notion of the state of agitation into which at first the mere thought of having to speak in public threw me. My heart beat wildly and strongly, my blood rushed all about my body, I seemed turned into moisture and warmth, most of all my ideas either left me altogether, or fell into confusion beyond all control. This is just what happened the first few times I ventured to speak at all, so that what I said bore no proportion whatever to what I might have had to say. But now, by taking such opportunities as present themselves, I am acquiring some composure; last evening I spoke twice at a dinner given by our students: it was the first time I had ever spoken at a dinner. Though what I said was no doubt wretchedly poor, I am satisfied to get off passably, and do better on a future occasion. And when ideas are not deficient, speaking is so much a matter of practice, that I may almost hope to become a good and fluent speaker. So may I not hope to become passably social? May I not hope by making myself better known to those around me, to use my acquirements with better advantage, and gain position, which I desire more as a means than an end? And may I not even find the society of ladies and friends generally a relaxation from my own devouring thoughts, much needed if I am to avoid all chances of a breakdown?

"The last few days I have been making some exertions towards this end. . . . I am looking forward to several considerable steps in my onward progress. I am on the point of getting myself proposed and perhaps elected a Fellow of the Statistical Society, as the use of the title F.S.S., the use of the library, and possible acquaintance with other statisticians, will be of high advantage to me. As my analysis of prices since 1782, too, draws towards completion, a most long and tedious piece of work indeed, I have formed the notion of reading the results at the next British Association. It will require some courage, but perhaps if I undertake it I shall get through all right.

"Lastly, I am going to spend nearly four months in

London, in continuous work upon the coal subject. I shall throw my whole energy into the work, and strive to form a piece of statistical reasoning on the subject which may in some degree approach one's abstract notion of what it should be. I will do my best, and I almost hope that I may be favoured with success.

"When I look back for a year or more, I cannot deny that I have made some advance; that I have published two small works—one with a success it does not deserve, the other perhaps deserving a success greater than it has had; that I have also commenced a new profession, and earned sufficient money by it to pay my way without inroads on my capital; and, when I look back to my notions in Sydney, they seem almost ludicrous. My faint hopes of a degree, B.A. at most, M.A. being a height beyond my view, my wondering respect for whole regions of knowledge, then a blank to me, now not quite so, and especially my respect for the position and name of a *statistician*. Now I have already been called, by reviews of authority, a *competent statistician*."

To his sister Lucy.

49 MORNINGTON ROAD,
26th June 1864.

"Before going to bed this Sunday evening I must write you a few lines.

"I am getting on pretty cheerfully in London. I get a good deal of work done at the Museum during the day, with some lunch and a cup of coffee in the middle of the day. Then between 5 and 6 I go and get dinner, and generally spend the evening out somewhere. It is surprising how occupations turn up. . . . Last night I had a great treat at the opera, H.M. Theatre. Titiens and others singing in *Fidelio*. I got a good seat in the gallery for 2s. 6d.; and, having the music with me, heard it to the best advantage. Titiens' singing was altogether splendid, and the music was even finer than I expected. We could not see the acting at all properly, having a very bird's-eye view of it.

"To-morrow night I shall probably be at the Monday evening concert, which I expect will be a fine one.

"I have begun my organ again, and have, rather im-

prudently perhaps, engaged for two hours' instruction and two hours' practice per week for three months, at a cost of £2 : 2s. It is cheap enough certainly, and I shall learn a good deal, but it takes up much time."

To his brother Herbert.

LONDON, 18*th July* 1864.

"I have now been a full month in London, working at the Museum at this subject of coal exhaustion.

". . . It is not at all easy work to grind up so extensive a subject, and get it all done in three months. London, too, is getting very hot, and I sometimes feel lazy and languid; perhaps I shall be too lazy to write to you next month or two. I don't know, but may be the others will write.

"About a week ago the council of the college (University College, London) elected me a fellow, with a share of proprietorship. This is the usual thing, sooner or later, to those who get M.A. honours. It is no profit and no honour, but still I like being permanently connected with the college."

To his sister Lucy.

49 MORNINGTON ROAD, N.W.,
12*th August* 1864.

". . . I am not nearly so well here as in Manchester, or as I used to be in London. Whether it is the heat or the feeding I do not know. I am, however, getting on with my work capitally; and perhaps, by an early time in September, may have done all that is needful in London. I can then finish up by the end of the vacation, either at Manchester, Beaumaris, or elsewhere, if you could find me very quiet lodgings for a week or two."

And again on the 16th August:—

". . . As the Museum shuts for a week on the 1st of September, I propose to be down with you the night before, so as to spend my birthday in Beaumaris. I shall not be sorry to leave London. As to the lodgings, I have nothing particular to desire in it except extreme quietness, if such a thing is anywhere to be had."

To his sister Lucy.

RUSHOLME,
SUNDAY, 16*th October* 1864.

". . . I have not much to tell you. I am, of course, busy, since I cannot wholly give up my private work, and yet have the college work to attend to. To-morrow night my evening classes begin, but I have managed so that they shall only occupy me two evenings, instead of three as last year.

"As I am receiving a few guineas now I feel far more settled, and have no doubt I can go on here as long as I am likely to wish to stay; and shall, therefore, be more free from anxiety. Eight months' work is a good deal to look forward to; but I think I shall promise myself a good holiday at the end of it—perhaps a good tour on the Continent with Tom. No one could enjoy better than I do a thoroughly good holiday; but, for some years past, I have not been in a position to take it."

To his sister Lucy.

RUSHOLME, 3*d December* 1864.

"I am sorry not to have answered your letter sooner; I would gladly write oftener, but that I have so much other writing and work to do, and it is by no means a light work for me to write a letter. . . . I hear a doubtful rumour through Aunt H. that you are moving. I hope it may be so for several reasons. If you do move before Christmas, I am convinced we shall have a most merry Christmas. If there is snow on the ground, the country will be especially beautiful. I am in much want of a holiday; for the truth certainly is that I overworked myself during the summer altogether; I have consequently to take much rest now, and to go an excursion almost every week. Last session somewhat exhausted me; and then London and Beaumaris did not set me up; so that, when I got back here, I just felt as if a good long holiday were the thing for me, rather than a session's work. My anxiety at Beaumaris, with the further anxiety of setting my college classes to work again, and the *Coal Question* at its most difficult and tiresome point, were certainly rather too much. But now that I know what it is

to be overworked I shall take care to avoid it for the future. I am now quite well."

In November of this year Mr. Jevons was elected a fellow of the Statistical Society, London; he also became a member of the Manchester Statistical Society, and took much interest and pleasure in its meetings, attending them as frequently as he could during his residence in Manchester.

In Mr. Jevons' note-book he has entered that, during March 1864, he contributed a notice of Kirchhoff's Second Memoir and Map of the Spectrum to the *Philosophical Magazine;* notices of Hearn's Plutology and Robertson's Laws of Thought to the *Spectator;* and an article on "Statistics of Shakespearean Literature" to the *Athenæum.*

Under the heading "Coal Question," he writes:—

"First attention given to the subject in 1861 or 1862. Inquiry commenced in January 1864. Chiefly carried out at Museum library, June and July 1864. Writing completed before Christmas. Transmitted to Mr. Macmillan about 28th December. Accepted 6th January 1865. Published during the week 24th and 30th April 1865." The complete title of the book is *The Coal Question; an Inquiry concerning the Progress of the Nation and the Probable Exhaustion of our Coal Mines.* The geological aspects of the question are first considered, Mr. Hull's estimate of the amount of coal still to be found in Great Britain being adopted as the most probable. Then follow chapters on the cost of coal mining, on the price of coal, on inventions in regard to the use of coal, and on the supposed substitutes for coal. But these chapters only lead up to the more important part of the book, which points out the rapid growth of the population of Great Britain during the present century; the vast expansion of the iron trade and other manufactures; and the enormous recent increase in the consumption of coal.

In the preface Mr. Jevons says that, when he began to study the question, he had little thought of some of the results which the inquiry would lead to. Before the close of the book, he shows that, "if our consumption of coal continue to multiply for one hundred and ten years, at the same rate as hitherto, the total amount of coal consumed in the

interval will be one hundred thousand millions of tons." According to Mr. Hull's estimate of the available coal in Britain, there are only eighty-three thousand millions of tons within a depth of 4000 feet. From these facts Mr. Jevons draws the conclusion, "*that we cannot long maintain our present rate of increase of consumption; that we can never advance to the higher amounts of consumption supposed.*" But this only means "*that the check to our progress must become perceptible considerably, within a century from the present time.*" It may be of interest to add that during 1863, the latest year for which returns were available when Mr. Jevons wrote, the amount of coal ascertained to have been raised from our coal mines was 86,292,215 tons. In 1883—just twenty years later—the amount raised was 163,737,327 tons.

In May 1865 Mr. Jevons was appointed Professor of Logic and Political Economy in Queen's College, Liverpool. As he had to spend only one night in the week in Liverpool, this appointment did not interfere much with his work in Manchester. On May 16th he went to London to read a paper to the Statistical Society "*On the variation of Prices and the value of the Currency since* 1852." The results contained in this paper were obtained by applying more extensively the method of investigation employed in his pamphlet on a *Serious Fall in the Value of Gold;* and, as there were also four diagrams, the labour of preparing it had been very great.

To his brother Herbert.

9 BIRCH GROVE, RUSHOLME,
MANCHESTER, 25*th May* 1865.

"The *Coal Question* has been out now for a month, and notices of it are beginning to drop in, but not so quickly as one might wish. However, I will give it a year or two for its trial. The reasoning in the book is, I think, almost unanswerable, except where I have left the question open; but not one in a hundred that look into the book will read it properly; and it is irritating to find that those who notice it usually represent your statements as far as possible from the truth, and overlook all the strong points of argument. However, the subject is one that must receive attention before long.

"My appointment to the professorship at Liverpool has just been announced in various papers. I shall like having such a place in the old town and the old Mechanics', and it will no doubt repay me for all the trouble one way or another, but the pay will be small indeed.

"It is only this afternoon virtually decided by the trustees at Owens College that I am to be lecturer in political economy next session, getting £50 and the fees. I shall hold the tutorship very much as a nominal thing next year, as it does not pay in my hands proportionately to the great amount of the work.

"I have recently got over a piece of work that I was anxious about, namely, reading a paper before the Statistical Society on Prices, in continuation of the pamphlet. I got through it pretty well, half reading and half lecturing, and shall perhaps be able to send you a copy in a month or two.

"We have now only about a week more of the working session, and my college work is light, although I have other things to do. My newest job on hand is a reasoning machine, or logical abacus, adapted to show the working of Boole's Logic in a half mechanical manner. I got a rough model to work excellently the other night, and I think I can easily get it finished during the summer. It consists merely of a number of slips of wood with sets of letters or terms upon them, with little hooks by which they can be readily classified in any order. This classification represents the processes and results of reasoning; and by its means I can argue out in a minute or two problems that would be very puzzling otherwise."

To his sister Lucy.

9 BIRCH GROVE, RUSHOLME,
3d June 1865.

"I daresay you will be glad to see the enclosed notice in the *Liverpool Daily Post.* It ought to sell a few in Liverpool. There are other indications that the book is beginning to have some effect. Please return this slip of newspaper.

"I have been thinking much about the disposal of my vacation. I have now done with my pupils altogether. Next week, and a part of the following perhaps, I am engaged

to assist in overlooking the Oxford local examinations, for which I shall be paid a little. I propose about the 19th to go up to London and stay a few weeks, on the pretext of working at the Museum; but really, I think, that I may have a little amusement. Then I should like a few weeks with you if the Sportsman room can be engaged.

"I long for a little country, and rest which I seem never destined to attain.

"Your house must be a delightful retreat, what with the cheerfulness within and the scenery without. I should think you ought all to bathe frequently. I shall bathe twice a day at least on that fine beach.

"The arrangement for my becoming political economy lecturer is now partially sanctioned by the trustees, and Christie has stated his intention of resigning soon."

Before leaving Manchester for the vacation he wrote to his friend Mr. Edmonds:—

16th June 1865.

"I find I have let nearly two months pass without answering your very pleasant letter, but it was with the full intention of doing it with more leisure in the holidays, now beginning.

"I was afflicted at the time with a statistical paper on prices, entailing constant calculation, but that is now done and probably in print (I will send you a copy presently); and now my college work is almost done. During these two years at Owens College I have had a great deal of hard uncongenial work in tutoring, and very little pay; but I have prospects of pleasanter work. Next session I am to be lecturer in political economy both day and evening, and shall also go one day a week to the Liverpool College, where they have lately made me professor of the philosophies, etc.

"I don't know whether you have seen any mention of my *Coal Question* yet, published by Macmillan. I hope something may come of it in the shape of reviews, etc., presently.

"We form a regular college set here, Greenwood, Clifton, Roscoe, and myself, all from U.C.L. With the other professors and other friends in the town we have the

pleasantest society. Manchester is by no means so devoid of pleasures as might be supposed. Our college, though rather dirty in its habitation, is prosperous, and looking forward to better days in a grand new building, when that can be carried out. When we get it up you must come and see it, unless anything should bring you sooner, and give me the pleasure of a visit here. Whenever you come north let me know, and you must come and stay with me.

"In about a week I shall be off for a vacation of three months, most of which I shall pass in the country, and a part, I hope, on the Continent, where I have never been since 1854."

Instead of going to London Mr. Jevons went, towards the end of June, to visit his sister at Clynnog in Carnarvonshire, Mr. and Mrs. John Hutton having removed from Beaumaris to that neighbourhood. The beautiful scenery, a combination of mountain and sea, pleased him exceedingly; but he never could stay long in one place without being at work for at least a part of the day; and, feeling that he needed a real holiday, he went to Switzerland for a month with his brother Tom, starting towards the end of August. This, his first visit to Switzerland, he always looked back to with the greatest pleasure, and spoke of as having been a perfect holiday, with no drawbacks to spoil its enjoyment.

To his sister Lucy.

ROUEN,
Saturday, 25th August 1865.

"In spite of my getting no sleep on board the steamer all night we got on capitally yesterday, reaching Dieppe about 3 A.M.; we got breakfast, saw the sun rise and the town under a very pretty aspect—the people all just going to their work. Then went on to Rouen, with which we were greatly pleased. The church of St. Ouen is a splendid piece of architecture, and from the top of it we saw the town. The new streets here building are fine; but the old houses and bits of Gothic architecture remaining elsewhere are unique.

"We are in a small hotel here, the 'Victoria,' which English people rather like, as they speak French very slowly and distinctly. We were so tired with two days'

work and no sleep that we went to bed last night at 8 P.M. and slept beautifully till 7.30 this morning, so that we are ready for anything. We go on through Paris to Strasbourg. I have got on with French speaking far better than I expected, seeing that it is twelve years since I was in Paris, where I spoke very little, and that I have hardly done anything in French since."

To his sister Lucy.

HÔTEL DES BALANCES, LUCERNE,
30th August 1865.

". . . We came on to Basle yesterday in company with a good many other English people. There was nothing remarkable in the French line of railway which passes by Troyes and Mulhouse straight to Basle except its comfort for travelling. . . .

"To-day we have had rain following on the terrible hot weather, from which we had suffered since leaving London. We should like to start to-morrow for the Rigi, or for Mount Pilatus, in order to have a sunrise view of the Alps, but I fear we may have bad weather. One great point here is to hear the fine organs. We heard a few notes on what seemed a beautiful-toned organ in the cathedral at Troyes. To-morrow, perhaps, we shall hear one here, and I shall make a point of hearing that at Freiburg well, as it is said to be the finest in the world. Though we got here before six o'clock we have not seen the Alps at all, and little or nothing of the lake. We were greatly pleased by the first view of the Rhine at Basle. It is a grander stream than I expected, and we had a capital bathe in it. Basle is a beautiful town altogether, and the cathedral is no doubt highly interesting. As, however, we were shown over by a German woman talking French, we were hardly enlightened by her descriptions of the place.

"*1st September.*—I have had a very glorious birthday for the beginning of my thirty-first year (thirty years of age). We went up the Rigi yesterday, and, the day being rather overcast, easily got a good bedroom in the hotel at the top, 4500 feet above the sea-level. The sunset was a failure, and our only hope was an appearance of thinness in the

clouds, which covered the sky and mountains. This morning we were up long before daybreak, and before the horn had aroused the rest of the hotel. On looking out of the window we saw darkly the whole chain of the Alps before us. We were out before all but one Frenchman, but within an hour or so as many as sixty or seventy tourists of all nations appeared, shivering on the top of the mountain. Though the view might doubtless exhibit much finer effects than we saw, yet it was a most lucky chance that we saw the Alps completely clear of clouds, rising up from the lakes at our feet, and growing by steps into the snowy summits of the Oberland. A chain of mountains and snowy points 120 miles long was then seen on one side, while on the other the comparatively plain parts of Switzerland stretched away up to the Jura and Vosges mountains and the Black Forest. Almost perpendicularly under us was the lake of Zug and parts of that of Lucerne, while a multitude of less important lakes were on various sides. Yet both Tom and I noticed that there was a want of colour about the Alps, and for beautiful tints the view we saw could not compare with that from Snowdon on the fortunate morning when we saw the sun rise there.

"After waiting till 9 or 10 A.M. to see the Alps under a full sun, we descended in full view of the beauties of Lake Lucerne, and returned to Lucerne by steamer. After a bathe in the lake I spent the rest of the afternoon on music, first listening to a young German playing fugues and organ sonatas of extreme difficulty on the new organ in the English Church, very fine playing in its way, but devoid of sweetness; and next, in hearing the usual afternoon performance in the cathedral. The playing was first-rate, for the purpose of showing the points of the organ. The great point was the *vox humana* stop of extraordinary perfection and sweetness, so beautifully played as to give the effect of a single solo singer, of a quartette of singers, or of a chorus of voices in the distance, occasionally accompanied by the organ as it seemed, but really wholly played upon pipes. At first it was impossible not to believe that there were singers in the organ gallery, and it was only by degrees that the mechanical nature of the sound could be detected by its

regularity. The most extraordinary performance, however, was that of a storm. While a gentle voluntary is being continuously played distant thunder is heard gradually approaching till it seems to fill the church in loud peals, and a shower of rain is heard falling all over the church, and pattering on the roof and windows. How the latter was produced I do not know; it must have been by some stop or contrivance in the organ, as the sun was shining all the time, and there was no rain. But I only found out, half-way through, that it was not real rain, and Tom remained deluded to the end. There were other more common effects, but of great beauty, upon the flute, clarionet, and other stops, besides heavy effects upon the full organ.

"We go on to-morrow early towards Interlaken, and a variety of places that Tom has got at his fingers' ends, and which I daresay will be very fine when we get to them. I hardly think, however, that we can have a better day than this on our tour.

"*Interlaken, 2d September.*—We have got on here to-day. As we started from Lucerne at 7.30 A.M. we had no opportunity of posting letters. We got here by a beautiful sail down the Lake of Lucerne, then a diligence ride over the Brünig Pass, and a second beautiful sail over the Lake of Brienz."

To his sister Henrietta.

INTERLAKEN,
Sunday, 9th September 1865.

"We were very glad to get letters yesterday from you and Lucy on our return to this pleasant place. We have had a splendid week in the mountains since writing last from Interlaken; we have been almost constantly in view of enormous rocks and precipices, snow-covered peaks and wonderful glaciers. Thursday was perhaps the best of all the days. We then made an excursion quite into the centre of the glacier region. Starting from the Grindelwald Valley with a guide about 6 A.M. we went by a steep winding path up precipices and along the steepest imaginable slopes till we entered a narrow gorge by which the lower Grindelwald glacier makes its way out. Then after a little refreshment at a châlet we climbed down into the glacier. In many

parts this is more like a collection of icebergs filling up the bottom of the valley, but where we got on to it the surface was pretty even and solid. Still there were crevasses and great holes and gulfs descending 30 or 40 feet or more, which it was very desirable to avoid. It was only here and there that the ice was slippery and it was necessary for the guide to cut steps in it; generally the surface was paved over with stones left by the ice as it continually melts. We walked up the glacier for about an hour, chiefly along vast and singular heaps of rocks and stones in continuous ridges or moraines, of which there were several in the middle as well as at the sides of this glacier. We then reached a place called Zoesenberg at the head of this *mer de glace*, at the point where it is formed by the meeting of two other great glaciers. Here there was a hut or two belonging to a shepherd who keeps a few sheep and goats upon the summer grass, which grows even thus high. Not finding the *pâtre* of Zoesenberg at home, and having both plenty of time (9 A.M.) and plenty of strength, we got the guide to show us the way up the Zoesenberg horn, a rocky mountain, which rises up almost perpendicularly. On getting to the top of it we were close to the higher parts of some of the glaciers, where stupendous masses of ice were hanging over precipices, and where we seemed to be in a world altogether different from that below. We got back about 3 or 4 P.M. rather tired. Both there and elsewhere we have heard a great many avalanches. They fell chiefly during the hottest part of the day, when the ice expands and is loosened by melting. They arise generally where a glacier moves down on to the top of a precipice, and bit by bit falls over the edge. It generally looks only like a little white dust falling over the rocks, but the crashing noise which soon follows shows how great the fall really is. Whether you hear it near or not the sound is like a sharp kind of thunder, and, often echoed among the mountains, is peculiarly grand. When staying at the hotel on the Wengern Alp, we had the luck to see a very large fall of ice on the precipitous side of the Jungfrau just opposite. It fell many thousand feet in all, pouring over one precipice after another, making a loud roaring noise all the time, until at last it subsided into the

valley, adding to a heap of snow already lying there slowly melting.

"One very curious thing here is the abundance of hotels at the top of mountains, far higher than Snowdon. Every evening after climbing a mountain and seeing the sunset we find an excellent and even a grand dinner ready, a comfortable bedroom, and in fact everything you can need. This is very strange at first to English people, but the fact is that the Swiss are quite accustomed to living up mountains many thousands of feet high, and we visited one large village called Mürren, 6000 feet high.

"Towards the end of our week we got rather knocked up. We were thus rather glad to get back to this luxurious place, and to our very quiet and pleasant Hôtel Fischer here. This afternoon, however, we most probably go on to Thun, Berne, and Freiburg. Lausanne will be the next direction, and then we shall soon be home. I wish to be in Manchester by the 21st or 22d September."

To his brother Herbert.

9 BIRCH GROVE, RUSHOLME,
18th October 1865.

"My prospects here are somewhat improved. Mr. Scott has not been well enough to come back, and has asked for leave of absence for a year. I have consequently been appointed his substitute in logic, for which I shall receive nearly £70. I have already Christie's political economy class—about £60. My evening political economy class met for the first time last Monday and is very large, probably on account of the scholarship in political economy which is to be awarded soon. I am resigning the tutorship here, which is tiresome and pays little.

"I have now been three times to the Liverpool College, but the number of students are very small, and the prospect not good. I am, however, guaranteed £1 a day, which will leave me perhaps about £30 profit above cost of railway. As Uncle Timothy has asked me to sleep at the Hamlet once a week, the journey becomes a rather agreeable 'out.'

"The introductory meeting with my address [on Reading and Study] was a stupid affair. I send you a partial

report. The main point is my logical machine, on which I am working now. The one adapted to lecture-room use is now almost done, and I am thinking of a more complicated one adapted to extensive problems and arguments."

To his sister Lucy.

9 BIRCH GROVE,
4th November 1865.

"It is so long since I wrote last that I fear you will think I never intend to write again. But I want so much time for my work that I write none but business and indispensable letters as a general rule.

"Tom has got a fine day to start, and will probably have most of the passage fine, the barometer having risen a good deal lately. I intended to have gone to see him off, but he wrote to say that he was going on board at 9 A.M. and did not expect me, and it would have been hardly possible for me to get there. He goes off, I believe, in the best spirits, and it is no wonder, considering how fair his prospects are.[1]

". . . I have very much improved the design for my reasoning machine in the last week or two, so that it will ultimately be a rather wonderful thing, I think. It will be played upon like a piano, and give the results of what you read to it without any trouble of thinking further."

To his brother Herbert he writes a fortnight later:—

". . . The *Coal Question* does not make much way, but I have plenty else to think about now. I am getting my reasoning machine into a true machine form, it having previously been an abacus or counting board, not a machine."

In his journal he writes:—

"*Birch Grove, Manchester,* 10*th November* 1865.—At intervals success rewards me deliciously, but at other times it seems but to oppress me with a burden of duty. More and more I feel a lifelong work defined beforehand for me, and its avoidance impossible. Come what will, I cannot but feel that I have faculties which are to be cultivated and developed at any risk. To misuse or neglect them would be treason of the deepest kind. And yet the troubles are

[1] Mr. T. E. Jevons had accepted a business engagement in New York.

not slight which such a high and difficult work brings upon me. One duty, too, seems to clash with others. My ideal seems to involve contradictories. I would be loved and loving. But the very studies I have to cultivate absorb my thoughts so that I hardly feel able to be what I would in other ways. And, above all, poverty is sure to be my lot. I cannot aid others as I would wish. Nor in a money-making and loving world is it easy to endure the sense of meanness and want which poverty brings. And if I could endure all this myself, I could not expect nor hardly wish for a wife nor any relative to endure it. Half my feelings and affections, then, must be stifled and disappointed.

"It is when I have such feelings as these that this book serves me well. I look back to my former confessions and my former resolutions: *I find I have too long pursued a straight and arduous course to think of swerving now.* I must choose the greater duty, the higher work, where work or duty would seem to clash. I must cultivate indifference to other people's opinion where I cannot rightly hope to gain it. I must work like one who is a servant not a master, must execute the orders he so plainly receives, to the best of his ability, and feel no anxiety for the result—it is not in his hands nor on his responsibility.

"*Sunday Evening, 3d December* 1865.—My changing moods of hope and depression, of long-sighted resolution, and of present prudence, are strangely marked in these successive paragraphs. Now I am no longer inclined to brave the worst hardships of a poor author's life, and strive to earn its deserts and honours as my only reward. I have often thought, in reading or hearing of the lives of the great but unfortunate, that a little prudence, now and then a slight relaxation in the ardour of pursuit, would have yielded far greater results. It is not poverty and overwork and hopeless anxiety surely that will raise the powers of mind to their highest. It is mere asceticism to prefer the harder and more straightened life if a happier and perhaps more useful one offers.

"Have I not sufficient, or more than sufficient, ardour in the pursuit of discovery and knowledge? Have I not in the last few years seriously overstrained my head once at least, and may I not justly fear that some day my strength will

prove unequal to the labour that my position may demand? I have shown how much I would risk where it must be risked. It would be foolhardiness to refuse the easier and happier life if it were in my reach. I confess I can hardly bear the thought of a solitary life of unrelieved labour. The happiness of marriage may not be the only happiness, the only good, I aspire to; but am I excluded from the one because I hope for the other?

"It is at times truly depressing to work for future appreciation only. Money, rank, manners, social position, or, at the best, brilliant talents, carry off all consideration at the moment.

"The work of the thinker and inventor may indeed prove for ever futile and mistaken; but even if it be in the true and successful path, it is not, and perhaps can hardly be, recognised at once. At least it is not. One of my chief reasons for the little love of society, is that in most company my hopes and feelings seem snuffed out.

"*14th December* 1865.—Yesterday I had a letter from Sir John Herschel, approving in the most complete manner of my *Coal Question*, which I lately had sent to him. Long periods of labour and depression have to be repaid in brief moments of such satisfaction as that letter gave me—perhaps I may say amply repaid. If the book, which was to me a work of intense interest and feeling, is read by few and understood by fewer, it has at least the endorsement of one scientific man whom I should perhaps of all in the world select as the most competent judge of the subject as a whole. I may almost say that I feel the work is not a slight one—to myself I cannot help but say it. When I set about it the subject inspired me to make exertion and treat it worthily if possible. And at least labour was not wanting. For I worked throughout one vacation at it, often writing for five or six hours at a stretch, scarcely leaving my seat. No wonder I was somewhat the worse when college work came on in addition to the work of completing the book. I may well be glad it did not destroy my powers.

"Now it is indeed pleasant to be assured that I was under no mistake."

From Sir J. F. W. Herschel, M.A., F.R.S., etc. etc.

COLLINGWOOD, HAWKHURST, KENT,
23d November 1865.

"DEAR SIR—Pray accept my warmest thanks for the very valuable and important book you have been so kind as to send me on the Coal Question. It embodies, in the most clear and luminous form of expression, and supported by the most telling statistical documents, a mass of considerations that, as I read them, seemed an echo of what I have long thought and felt about our present commercial progress, and the necessary decline of our commercial and manufacturing supremacy, and the transfer of it to America. *Longe absit.* But it *must* come—and *I think you have been merciful in giving us another century to run.*

"Such a work as yours has been long wanted to dissipate *completely* the delusion which so large a majority of our countrymen labour under, of the '*inexhaustibility* of our mineral resources,' etc. etc., and the 'probability, amounting to certainty,' that science will, ere long, put us in possession of a substitute for coal. A dim perception of the truth, to be sure, has dawned here and there; but, after this, let no man plead ignorance and say, 'Who would have thought it?' Not that I suppose we shall take warning. In such a rush there is no pulling up.

"I have read every word of it (received yesterday) with the avidity with which one devours a new novel; and, when I laid it down, I could not help inscribing on the title-page, as a motto—

> "'Old experience doth attain
> To something like prophetic strain;'

and (not without a most melancholy feeling) under the words 'THE END,' on page 349, Dido's parting words, viz.—

> "'Vixi et quem cursum dederat Fortuna peregi!
> Et nunc magna mei sub terras ibit Imago.'

"It used to be a favourite notion of mine that the tides might be utilised to transmit power through air-tubes up the country to any extent, till I made a calculation. . . . Once more repeating my thanks, I beg to remain, dear sir, yours very truly, J. F. W. HERSCHEL."

In his journal he writes :—

"17*th December* 1865.—My mother says in her diary, 7th July 1822 : 'The habit or the power of giving your attention strongly to any object of attainment is a most difficult acquisition, and childhood is the time when it can be best attained—afterwards it is a task of no common difficulty to resist every temptation around you.'

"I believe that by long practice, ever since my childhood, I have acquired no inconsiderable power of this kind. I am seldom troubled now by not being in the humour. Even in composition I can sit down at almost any time and work at what I want. I can thus give one day to one subject or work, another to another, or can portion out my work as is desirable. Or I can carry on different kinds of work from time to time, passing from one to another without the least difficulty. My danger is somewhat the other way. I can concentrate my thoughts upon a subject at almost any time, till everything else vanishes out of view. But, if I am once interested or excited about a subject, I cannot always dismiss it.

"In the autumn at Clynnog, I got involved in Boole's Probabilities, which I did not thoroughly understand. I thought and wrote about it hard for a week or two, until I found I could not dismiss the subject. The most difficult points ran in my mind, day and night, till I got quite alarmed. The result was considerable distress of head a few days later, and some signs of indigestion.

"I feel that some degree of inaction and laziness is now a virtue rather than otherwise. Ease and freedom from work is as pleasant to me, perhaps, as to any one ; and it is no small privilege to enjoy the reaction from hard work."

CHAPTER VII.

1866–1868.

DURING the early part of 1866 Mr. Jevons suffered much from anxiety and depression, as his journal plainly shows.

"*1st March* 1866.—Even though the deepest disappointment should come upon me, give me strength, O God, to be thy brave and true servant.

"*4th March* 1866.—How can we doubt that there is a God, when we feel him moving in us? In the midst of anxiety and disappointment and sense of failure, such as I have seldom had to feel before, I spent a morning of calmness and hope almost inexplicable. I went to chapel, and prayers, hymns, and lessons seemed written to inspire me with confidence. Whence is this feeling that even failure in a high aim is better than success in a lower one? It must be from a Higher Source, for all lower nature loves and worships success and cheerful life. Yet the highest success that I feel I can worship, is that of adhering to one's aims and risking all.

"*5th March* 1866.—Such were my thoughts yesterday. To-day I have reassurance which seems to me nothing less than providential. The following is the copy of a letter forwarded me by Mr. Macmillan:—

"'WINDSOR CASTLE,
24th February 1866.

"'MY DEAR SIR—I am not certain whether I owe to your kindness, or to that of Mr. Jevons, my early opportunity of perusing his work on Coal; but I have perused it with care, and with extraordinary interest. It makes a deep impression upon me, and strengthens the convictions I have

long entertained, but with an ever-growing force as to our duty with regard to the National Debt.

"'I think it is a masterly review of a vast, indeed a boundless, subject.

"'But I feel that I have not the scientific knowledge which alone could make me a competent judge of the grave conclusions involved; and I shall look, with the utmost interest, for other and weightier opinions upon this remarkable product of the English economic school.

"'Pray take my thanks as intended both for you and for Mr. Jevons, and believe me, I remain, faithfully yours,

"'W. E. GLADSTONE.'

"11*th March* 1866.—I seem to have more clearly before me, by degrees, the position to which I would aspire. Accepting the progressive triumphs of physical science, I would aid in the reform of abstract science, and in the establishment of moral and political sciences. But I would also join science to morals and religion. I would try to show that they are not antagonistic.

"24*th March* 1866.—I have lost and shall lose many of the most exquisite and true pleasures of life, but I can look upon their loss without much regret when I feel that I am following something above even such pleasures. But there is one thought that fills my soul with dread. It is the thought of

> "'That one talent which is death to hide
> Lodged with me useless.'

It is a fearful trust for one to have who feels he has not judgment, and the worldly means and qualities which would enable him to use it with effect.

"28*th March* 1866.—I cannot forget or omit to record this day last week. I was sleeping as usual for the night at St. Michael's Hamlet. As I awoke in the morning, the sun was shining brightly into my room. There was a consciousness on my mind that I was the discoverer of the true logic of the future. For a few minutes I felt a delight such as one can seldom hope to feel. But it would not last long—I remembered only too soon how unworthy and weak an instrument I was for accomplishing so great a work, and how hardly could I expect to do it."

To his brother Herbert.

9 BIRCH GROVE, RUSHOLME,
MANCHESTER, 24*th March* 1866.

"I am very sorry that I have been able to write so little of late. This term, however, is always a heavy one, and I have had, and have, causes of great anxiety which take up my thoughts. . . . If I can get this professorship which is now just declared vacant, I shall be all right. The salary is £250 and the fees. Of course I have a great many things in my favour, as I am doing the full work of the professorship, and am exactly suited for it by my degree, reading, etc. But the trustees will probably carry out their rule of making it an open election, and one cannot be sure how that will go. And there are many things, such as want of sociability, which will tell much against me. Probably I exaggerate the chances against me at present.

"One of the best things that has happened of late is the letter from the Chancellor of the Exchequer expressing great approval of the *Coal Question*, and allowing that it has strengthened his desire to reduce the National Debt. It may be a couple of months yet before the professorship is decided, and until then I cannot have much peace of mind. Before I can have an answer it will have been decided for better or for worse, so there is no need to say more at present. . . .

"Last Monday I gave an account of my *logical abacus* at the Liverpool Literary and Philosophical Society for about an hour and a quarter, and those present seemed pleased and interested."

The logical abacus consisted of a black board with four ledges attached horizontally. A number of slips of wood with small and large letters printed upon them in various combinations were ranged upon the ledges, and by means of wire pins could be readily classified in any required order. The results were arrived at by gradually rejecting those combinations of letters which were inconsistent with the premises, until only those remained which contained the desired information. The same sets of letter combinations

would do for any number of various arguments, the meaning of the letters being properly defined for each argument beforehand.

On the 3d April Mr. Jevons gave an account of his logical abacus at a meeting of the Literary and Philosophical Society in Manchester. He explained that it was "an attempt to reduce the processes of logical inference to a mechanical form." The purpose of the contrivance was to show the simple truth, and the perfect generality, of a new system of pure qualitative logic closely analogous to, and suggested by, the mathematical system of logic of the late Professor Boole, but strongly distinguished from the latter by the rejection of all considerations of quantity. He also said, "The logical abacus leads naturally to the construction of a simple machine which shall be capable of giving with absolute certainty all possible logical conclusions from any sets of propositions or premises read off upon the keys of the instrument."

When Owens College was first established, the principal of the college was also professor of logic, and the professor of history taught political economy, but it had now been resolved to found a professorship of logic, mental and moral philosophy, and political economy. Mr. Jevons applied for the new chair. It would not only give him a definite position, but enable him to have greater leisure for carrying on his private work, and until the appointment was decided he could not help being very anxious as to the result. He was still feeling the effects of overwork; and this, no doubt, made him less cheerful than usual, and more inclined to exaggerate the chances against his appointment than he would otherwise have been. Some years afterwards he said he remembered at this time lying awake night after night until the daylight came, when a dog at a neighbouring house always began to bark. This had the effect of sending him to sleep at once; which he thought a singular fact, as usually the barking of a dog was one of the noises which most irritated his sensitive nerves.

There was never much reason to doubt that he would obtain the appointment; not only had the whole course of his studies prepared him for it, but he had also been under-

taking the duties of the professorship for some time, so that his fitness must have been well known to the trustees.

If the uncertainty about the professorship was a cause of deep anxiety, he had much gratification in the attention which the *Coal Question* was now receiving. Mr. John Stuart Mill drew marked attention to it in Parliament in the speech in which he urged, for the sake of posterity, the present duty of making greater efforts for the reduction of the National Debt. Mr. Gladstone also spoke of the book in Parliament, and seemed disposed to some extent to adopt its conclusions in framing his financial policy. It was discussed in all the leading journals, and from this time Mr. Jevons' position as a writer on applied economics was fully recognised.

In his journal he writes :—

"12*th April.*—This morning the advertisement appeared opening my coveted professorship to public competition. I have toiled and I have fought my weaknesses, I have hardly left anything undone which in my poor judgment would secure success. Surely the result is not in my hands?

"15*th April.*—The one thing requisite to me is invincible determination and perseverance. When I think what discouragement I have gone through, I feel sure that the greatest of disappointments cannot permanently shake me.

"20*th April.*—What is this poor mind of mine, with all its wavering hopes and fears, that its thoughts should be quoted and approved by a great philosopher in the Parliament of so great a nation? Do not grant me intellectual power, O God, unless it be joined to awe of Thee and Thy works, and to an ever-present love of others!"

To his sister Lucy.

9 BIRCH GROVE,
26*th April* 1866.

"Your letter to me received this morning was very agreeable. I have had very pleasant congratulations from Uncle William, Uncle Timothy, Mary, and others. You will, I daresay, excuse my being a little too full of myself at present. It is hard even for me to feel the full meaning of such sudden and complete success. If I had worked ten or

twenty years longer, I might have been glad to have got the result I already have got. To gain the reputation of having settled two of the most difficult questions will be no slight aid to me in future.

"Does it not seem strange and incredible that what I was writing in that little cupboard in Rotten Row at Beaumaris should be altering the opinion of the whole country, and even destroying the hopes of the greatest of nations? I distinctly remember thinking in Sydney that if there were one thing I should wish to be, it would be a recognised statistical writer. How strangely my wish has been fulfilled! If I should live long and have as much success in other undertakings, what will come of it? I hardly like to anticipate anything.

"I hope you will not be the least discouraged about your painting. . . . But you must remember how much time and effort is needed in all matters of this kind. What success I have comes from labouring without cessation from the earliest years I can at all remember. A woman can seldom have the inducement or opportunity to the same constant attention and effort. No one can wish that she should. Except under very peculiar circumstances, she should not sacrifice herself and others to it. I think that women are often quite sufficiently admirable in themselves and their characters without accomplishments and works."

To his sister Lucy.

9 BIRCH GROVE,
9th May 1866.

". . . The *Coal Question* gets on apace. The papers are hammering away about it. A member of Parliament is going to move for a Royal Commission to inquire into the whole subject, and there will be one or two debates upon the matter probably. The *Times* accuses me of misleading Mr. Gladstone. Of course one must be criticised and abused a little. The more one's name is named now, the better for my professorship appointment. I have such strong opinions in favour of the *Coal Question*, and am so confident that nearly all parts of the book at all events will bear examination, that I am not afraid. I am kept, how-

ever, in a state of great excitement and anxiety altogether. I don't really doubt about getting the professorship, but I can't help feeling unsettled and nervous. There are a good many applications, but few of the slightest consequence.

"I feel as if I should be able to do anything when I get £300 a year. I long for a little rest."

To his brother Herbert.

9 BIRCH GROVE, RUSHOLME,
13th May 1866.

"Times here are a little lively. Not to speak of an impending European war, we have a commercial panic of a most extraordinary kind, arising from unsound trading and advances by these new banks and finance companies. You will, however, read about it in the papers. It is a little annoying to me, because I have just proved to the Statistical Society that panics ought to come in the autumn. However, I daresay we shall have a pressure then, this year or next, and statistics are peculiarly liable to these sorts of exceptions.

"The Coal Panic, as some of the papers call it, is the most interesting event to me. It gets on very well, as Gladstone has already propounded his plan for paying off the National Debt in part, and urged its adoption on the ground of the coal exhaustion. There is also to be a motion in Parliament for a Royal Commission to investigate the subject, which will, I have no doubt, be appointed. Thus, whether people are ultimately convinced or not, I have gained my end of getting the subject investigated. It would seem that Mill, followed by Gladstone, really frightened the Opposition, composed of old landed fogies who thought their rents would go on rising for centuries to come.

"Thus I have had quite enough fame for the present, and I should not be altogether sorry to retire in safety. It is quite possible that I may get somewhat roasted before long, and I shall have to defend myself, or bear it as best I may. Still, a writer's purpose is to get his opinions discussed, and I suppose I could hardly have had them more prominently brought forward than in Mill's speech and Gladstone's budget.

"Our trustees must, I think, be a little impressed by this time, so that I hope they will not much delay over the appointment to the professorship, but it may be some weeks yet before the matter is settled."

Mr. Jevons refers in this letter to his paper "On the Frequent Autumnal Pressure of the Money Market and the Action of the Bank of England," which he had read to the Statistical Society on the 17th April. It was published in the June Number of the *Statistical Journal*, and in the same journal also appeared "A Brief Account of a General Mathematical Theory of Political Economy," being the paper which he had sent to the British Association in 1862, and which had not yet been printed.

In his journal he writes:—

"*14th May* 1866.—The matter of this professorship will be settled by the end of this month. Disappointment, gloom, or despair may often or always be my lot, but I must try for the highest which I feel myself capable of. At the worst it is but one poor life lost, and it may be a great stake gained. If anything should go wrong with this professorship, I have the notion of undertaking a work on the limits and nature of knowledge generally, directed to set at rest the discussion between Mill and Hamilton.

"The last week or two I have had enough of newspaper fame. I know it is no slight thing to be quoted in the budget of a Minister when he announces a change in the policy of the country he leads.

"When I read different parts of this book, and compare them with each other—recent thoughts and feelings with those I had ten or twelve years ago—I cannot help saying how strange it is. What led me to work to an end I knew not, and to hope where there was nothing to hope? And I cannot but ask, Is the future to be constant as the past, and favoured by the like aid from I know not where? What I do cannot be my doing, for I feel too weak for it."

To his sister Lucy.

9 BIRCH GROVE, RUSHOLME,
21st May 1866.

". . . I write now to say that there is no doubt about

the professorship. The committee of trustees had a first meeting last week, and seem to have found that none of the candidates could at all oppose me; and Mr. Greenwood even said in a letter to me in London that there was no need of further trouble. One cannot realise at first how satisfactory this is.

"My visit to London was very gratifying. The visit to Gladstone was especially so, as he was pleasant and communicative—in fact talked so that I could get little in. It is something to make the acquaintance of the leading minister, and who is likely to be even more powerful than he is now.

"When I called on Macmillan, he at once proposed a second edition of the *Coal Question*, as the last copy was going, and there seemed to be orders on hand. I shall have to work hard to get it ready quickly."

In his journal he writes:—

"23*d May* 1866.—After so many entries in this fragmentary record, when I was anxious and dispirited, I should not omit to say that to-day the professorship is practically mine, the committee of trustees having yesterday decided to submit my name only to the general meeting, who will no doubt at once appoint me. I shall now have about £300 a year from the college, and nearly £100 from my own money. What can I not do with it?

"I should not omit a brief mention of my late visit to London. I had a pleasant meeting at University College with old students and others, and gave an account of my abacus. Professor Hirst made an interesting speech, and seemed pleased. De Morgan also, a day or two afterwards, saw it, and allowed that it achieved very well the exclusion of contradictories. My visit to Gladstone, however, was the striking event, which I shall not easily forget—as an author to meet a great minister in the height of his power.

"Some pleasant hours, partly with Mary Catharine Jevons, in the exhibitions, theatres, etc., filled up my time. I am too much rewarded. May I strive doubly hard to use aright whatever power is granted to me.

"31*st May* 1866.—This afternoon I was finally and positively appointed professor of logic and mental and moral

philosophy and Cobden professor of political economy in Owens College, by the trustees in full conclave. Mr. Greenwood asked me into the room, and the chairman, in a short speech, informed me of the appointment, and explained why rules had prevented their making the appointment earlier. I replied in a short but, I suppose, suitable speech, and the thing was done.

"*4th June* 1866.—I cannot be sufficiently thankful that I have never yet suffered any conspicuous public failure—on the contrary, I have enjoyed almost uniform success. I feel as if I had escaped untold dangers."

To the Number of *Macmillan's Magazine* for June Mr. Jevons contributed an article on Mr. Gladstone's financial policy. Towards the end of June he took a much-needed holiday, and after a few days at the English lakes he went on by himself for a tour in Scotland, which he had never before visited.

To his sister Henrietta.

ROWARDENNAN,
Sunday evening, 1st July 1866.

"You will probably like to hear how I am getting on, and I have this evening an hour or two to spare. I have not yet been two days in Scotland, and yet I seem to have seen a great part of it—in fact I have literally seen a great part of it to-day, having been to the top of Ben Lomond.

"I reached Glasgow late on Friday night, spent most of Saturday in looking over the town and visiting the Cathedral, College, etc., and in the afternoon came on here to have the Sunday in the country. This morning I went up the mountain, finding the ascent very easy. There were occasional showers of rain and clouds, but between them there was beautifully clear air, so that I could see great distances to the Grampian Mountains, Ben Nevis, the Clyde, and nearly to Edinburgh. The mountains too were beautifully diversified by shade and sunshine. I do not feel sure, however, that the view is so fine as that from Snowdon on a good day. To-morrow I go back to Glasgow by Loch Long; and on Tuesday I shall probably go north to Oban, and see a good many places in the Islands, etc.

"I spent three days with the professors and Nicholson

at the Lakes. Our party had a beautiful walk by Langdale, Scawfell Pike, Eskdale, and Coniston. Windermere reminded me of our excursion from Newton three years ago."

To his sister Lucy.

WAVERLEY HOTEL,
INVERNESS, *7th July* 1866.

"This is my farthest north point, and to-morrow I shall start homewards. I find Scotch travelling excessively dear. It costs me about thirty shillings a day as I am going now. The steamboats are very dear, and cost often a pound a day for a trip. But the travelling among the lochs and islands on the fine comfortable steamboats is very delightful, and every arrangement is made to allow you to see what you want. My best day perhaps was the excursion from Oban to Staffa and Iona and back. The islands on all sides are very beautiful, and unlike almost everything I had seen before. At Staffa we were landed in boats to see the basaltic caves, which were very fine. Again at Iona we landed to see the ruins of the chapel cathedral, with the ancient tombs of kings and the crosses, which were highly interesting. I don't know that Saint Columba, who founded the church, was any better than Saint Beuno, and he was not much earlier; but you have not in Wales the ancient tombs and crosses. Yesterday I left Oban in the regular course to visit Glencoe, and then on to the mouth of the Caledonian Canal, where I slept last night at Banavie at the foot of Ben Nevis. Ben looked very grand, with many patches of snow, but I was so prudent as to decline ascending him in the time at my disposal. This morning I came on through the Caledonian Canal. I hope that you will some time visit the west of Scotland, where you would make enchanting views of the islands and lochs.

"I think I can be with you if you are ready to receive me a day or two before the end of the month.

"I see that the Coal Commission is appointed, with the Duke of Argyll for chairman. I hear from Macmillan that 284 copies of the new edition of the *Coal Question* were subscribed for by the booksellers on its coming out, and he thinks that the whole edition will sell, so that I shall get some money from it, for a wonder.

"To-morrow I hope to get into the Highlands again by the railway.

"I shall walk through some of the best parts, and then visit Perth, Stirling, Edinburgh, etc."

To his brother Herbert.

EDINBURGH, 15*th July* 1866.

"I am now drawing towards the end of my tour, which on the whole has been highly successful and agreeable. Sometimes I am rather lonely; at other times I have too much company. I am rather hard to please.

". . . From Inverness I came south by the Highland Railway to Blair Atholl, on to Dunkeld, where I spent an evening very amusingly with one of my philosophical correspondents, a most curious Scotchman, slightly turned with metaphysics. Perth and Dundee were my next stopping-places. At St. Andrews I made friends with an old clergyman, who showed me all the antiquities of the place. It is beautifully situated on the shore, and is altogether a pleasant and curious place. Thence to Dunfermline and Stirling. Lastly I got here yesterday, and am amazingly delighted with the Modern Athens. In proportion to its size it must be the handsomest city existing."

To his sister Lucy.

DURHAM,
Wednesday, 18*th July* 1866.

"I hardly remember when I last wrote to you; it seems a long time ago. I have been to a great many places since. . . .

"I was charmed with Edinburgh, the most beautiful city existing, I should think. It looks like a crowd of castles and monuments, or rather like two groups of castles and monuments on two hills, with all manner of fine buildings and gardens disposed between. I found the Manchester Theatre Company playing the *Midsummer Night's Dream* at Edinburgh just as at Manchester. . . . I enjoyed the play amazingly, having just read it over a few days before. It seemed to me perfectly suitable for acting, and wonderfully entertaining.

"This morning I went from Newcastle to Monkwearmouth, and called on the manager and viewer of the large and celebrated colliery there. They were very civil, seeming much interested in the *Coal Question*, which one of them had partly read, while the other was just beginning some experiments for the Royal Commission. They gave me every convenience for looking over the mine to its deepest parts. It was dreadfully hot and oppressive in some places, and the men worked naked. After two or three hours below I came up all grimy, and in a suit of mining clothes, in which you would not have known me.

"The *Coal Question* seems to sell well in Newcastle. In one shop the man told me they had sold a *good few*, and had only two copies left. At the railway station I took up a copy there, and was much amused by the man saying, 'Fine work that, sir. The first edition sold off very quick.' There is a palpable want of truth about the latter part at least which takes away from the first.

"I am pleased with Durham, and the cathedral and castle look grand. I shall stay most of to-morrow here to hear the service, which is said to be very finely performed. Then I go on to York, where I want to see the Minster. On Friday or Saturday I hope to get home to Manchester, after a tour of a most varied character.

"Some time in the following week I hope to be with you at Clynnog; and I shall be glad to rest among friends, after so long coasting about among strangers."

Mr. Jevons returned to Manchester for the opening of the college session, when he began his duties as professor. On the 12th October he gave the introductory lecture to the session of evening classes, the subject he chose being, "On the Diffusion of a Knowledge of Political Economy."

In his journal he writes:—

"*November* 1866.—My introductory lecture to the course of Cobden Lectures has brought some little criticism from the Radicals upon me. I am often troubled, and now more than ever, to know how to reconcile my inclinations in political matters. What side am I to take — one — the other — or can I take both? I cannot consent with the Radical party to obliterate a glorious past, nor can I consent

with the Conservatives to prolong abuses into the present. I wish with all my heart to aid in securing all that is good for the masses, yet to give them all they wish and are striving for is to endanger much that is good beyond their comprehension. I cannot pretend to underestimate the good that the English monarchy and aristocracy, with all the liberal policy actuating it, does for the human race, and yet I cannot but fear the pretensions of democracy against it are strong, and in some respects properly strong. This antithesis and struggle, perhaps, after all, is no more than has always more or less existed, but is now becoming more marked. Compromise, perhaps, is the only resource. Those who rightly possess the power in virtue of their superior knowledge must yield up some, that they may carry with them the honest but uncertain wills of those less educated but more numerous and physically powerful.

"*4th December* 1866.—Some few days ago I began thinking about logic again seriously. I was determined to try whether I could not graft on to my system, as already printed, some extensions which may render it more perfect. After a day or two I suddenly met with what seems to me the great and universal principle of all reasoning, that same things may be treated identically, or that whatever we may say of one member of an identity we may say of the other. All logical processes seem to arrange themselves in simple and luminous order in one's mind the moment it is allowed as self-evident that if we start from the same beginning and pursue similar paths we must get to similar results. It would be worth while to spend years in developing a system of logic on this basis. But can I ever finish such a work? My health seems not to be what it was. I have had indigestion gradually coming on, and I fear to engage in the work I so much love. I am ready, I hope, at any time to yield myself up to Him from whom alone can come the power to achieve any worthy result."

To his brother Herbert.

BEAUMARIS, *28th December* 1866.

". . . The three years that I first spent at Owens College tutoring, lecturing, and writing at the same time

were undoubtedly too hard, and would have done me up if continued, but my work is now so much more easy, familiar, and congenial, and I have had so many holidays, that I shall be all right for the future, I hope.

"Henny and I are spending the Christmas holidays here with John and Lucy, who found Clynnog too dreary and solitary for the winter, and who were also disturbed by the prevalence of measles and other sickness in the country round and cholera in Carnarvon.

"I have posted you a *Times* containing some remarks on a letter of mine. I find it easy now to get attention to anything I like to write, and sometimes get a little abuse, but I am already somewhat seasoned to criticism. I feel it to be very necessary to be careful what I write, so as not to fall into any scrape or get shown up in a mistake. One man in the *Manchester City News* has taken to abusing me systematically every week, to the amusement of the college people and other friends. It is very difficult to know what view to take of the Reform agitation. I am not a democrat, as perhaps you know, and don't much care to adopt popular views to please the mob. However, I don't think any Reform Bill that is likely to pass will really upset our system here, while it may lead to many real improvements.

"I find myself a good deal taken up at present with my college work, with some additional public lectures or papers which I have undertaken; but if nothing else turns up, I shall have the summer pretty clear to go on with more important work.

"The professors have been a good deal engaged of late in elaborating a scheme for rebuilding Owens College, which at present is in a small dingy building in one of the worst parts of the town. We want to raise a great scientific University College in Manchester with all sorts of engineering, mining, and scientific schools. Harry Roscoe is, perhaps, the moving spirit in it, but most of the other professors, especially the new ones, are ardent about it.

"£6000 have already been promised for the engineering school, which is very popular, and will doubtless succeed, but

we want altogether some £100,000, which it will not be easy to raise even in Manchester. The beginning, however, is not altogether unpromising, and our present trustees are quite willing to promote the scheme and place it on a more public and important footing. Manchester is a fine place for public spirit. It is a kind of metropolis of the manufacturing districts, and I do not know whether there is any place out of London I should prefer to it. Indeed, there is some use and satisfaction in being out of London, and having a somewhat distinct position not involved in the great crowd of competitors in London."

On 16th January 1867 Mr. Jevons gave a popular lecture "On Coal: Its Importance in Manufactures and Trade;" one of a series of science lectures for the people, which had been established in Manchester that winter under the auspices of the science professors at Owens College. On the 10th April he read a paper at the Manchester Statistical Society "On the Analogy between the Post Office, Telegraphs, and other Systems of Conveyance of the United Kingdom, as regards Government Control;" but his time for private work seems chiefly to have been given to logic during this year.

In his journal he writes:—

"12*th March* 1867.—Sometimes I am in low spirits now, and distrust my future. I am unsociable, ill-tempered, and feel that I deserve no more than a hermit's life of self-denial and labour. But if I can do so with any safety to my health, I will labour, hoping that the success hitherto accorded me in a less important field will not be wanting in a greater. I excuse myself for writing in this book because I sometimes find it is a wonderful comfort to read over the record of my past hopes and despair, and observe how my hopes have been almost constantly better founded than my despair."

To his brother Herbert.

9 BIRCH GROVE, 22*d April* 1867.

"We have now got to the end of our long term, and as our next term is scarcely more than a month long, from Easter falling so late, we may be considered to have killed

the work of the half year. To-morrow morning I am going to start with Barker, our mathematical professor, for a few days' walking in the north of Lancashire and the West Riding. He will make a good walking companion, I think; the weather, too, promises fairly. . . . We propose to visit Clitheroe, Bolton Abbey, Malham, almost reaching the neighbourhood of Ingleton and Thornton, where we stayed before. I feel rather in need of a little walking. I have begun to take more exercise than I used, and am all the better for it. In fact, I am quite well again now; but I have always a tendency to overwork myself, and am now getting rather deep into logic again."

Mr. Jevons spent the first part of the vacation in London, but about the middle of July he went abroad by himself to see the Exhibition at Paris and make a short tour in Belgium and Holland.

To his sister Henrietta.

HÔTEL MEYERBEER, ROND POINT,
CHAMPS ELYSÉES, PARIS,
Sunday, 21st July 1867.

"The above is my address while I stay in Paris, which will probably be about a week more.

"I spent yesterday at the Exposition, and you cannot imagine anything more wonderful and interesting than the collection of things. Inside, the collection is not very different in appearance from that of the London exhibitions, though far more extensive; but the park outside the building is perhaps the most amusing. Here are an infinity of houses and shops of all nations, where you can see the manufactures carried on, or listen to the music, or taste the peculiar eatables of almost any nation under the sun. It is a sort of place where you can spend the whole day, from early morning till late at night, with a constant succession of new interests or amusements. When you are hungry you can dine to perfection in any style, when you are tired you can sit down to any kind of music—German, Chinese, Turkish, or what you like.

"*Tuesday, 23d July.*—I am not very fond of writing while I am travelling, there is so much else to do. As I have spent about twelve hours every day in the Exhibition

since I got to Paris, I am just a little tired; . . . but still it is very pleasant being here.

"It is impossible to tell you what there is in the Exhibition, and it would be equally impossible to tell you what there is not. I spent the whole of yesterday in the park or grounds, where the detached exhibitions are, and could not get over more than a fraction. You see the natives of a number of countries living and working in their own houses, or imitations of them.

"Inside the palace a great number of trades, especially the French and Parisian, are carried on. The variety of people one meets is also very curious. Besides crowds of persons of different nations, speaking French or German, there are Italians, Spaniards, Russians, Turks, Chinese, Algerians, Japanese. Strange-looking persons every now and then turn up of unknown nationality. There are the soldiers, too, of many nations, in various picturesque uniforms. The English do not make so much show in some ways as other people, but they seem to be in great favour, and everything is recommended, if possible, as being 'Anglais.' The evening entertainments, too, frequently are made up of English songs or amusements of one kind or another, always very foolish.

"I shall go probably on Saturday to Brussels and various towns in Belgium."

To his sister Lucy.

HÔTEL DE FLANDRE, BRUGES,
1st August 1867.

"It seems so long since I last wrote to any of you that I fear you will think me lost. I am, however, not only all right, but often thinking of you at Clynnog, and I am looking forward to being with you now within ten or fifteen days.

"It seems to me a long time since the holidays began, and, though I have got on better than I expected, it is still very lonely work travelling about by one's self. My travels, however, seem to get pleasanter as I get on. I have at last reached a city which I have for a very long time wished to see, ever since I read a novel called the *Merchant of Bruges*,

or something like that. I have not yet seen the town, however, having only got here just at dark, but I expect an interesting day to-morrow. To-morrow I also expect to get to Ghent, or Gand, as they call it here; the next day to Antwerp; and then, if my purse holds out, I suppose I must take some of the Dutch towns before making my voyage homewards.

"I had a fine day to-day in the old town of Tournai, which is something like Bruges on a smaller scale, but with a much finer cathedral. It is in fact a splendid and most interesting old church, and I saw it fully and to advantage. I had an interesting sight, too, of the sacristy, with the plate, and jewels, and curiosities, and especially the vestments belonging to the church. There was a vast sort of cabinet full of the finest vestments, in number between fifty and one hundred I should think, all covered with the most splendid gold embroidery, and from all ages up to 300 years. The day before was chiefly occupied in a visit to the Field of Waterloo. Perhaps you will remember my father often speaking of his visit to this part of the Continent and to Waterloo shortly after the battle of Waterloo.

"I spent one day and two nights at Brussels, which is a pleasant clean little town, but by no means striking to one just come from Paris."

To his brother Herbert.

9 BIRCH GROVE, *25th September* 1867.

"I am now glad to feel settled at home after a long holiday. Some way or other I am sick of travelling about, and wish for nothing so much as to be settled at home. It is yet, however, some ten or twelve days before the session begins. There are already some signs that the classes will be well filled this year.

"I am now much engaged upon the construction of my logical machine. I have found a young clockmaker in Salford, who has begun this week to work for me at thirty-five shillings a week. It will be necessary for me to go there almost every day to see that he is getting on right. I find it necessary to have each step of the work done separately, in order that I may see whether I have planned everything

rightly. I think it will certainly be done before Christmas, and I intend to send it to the Royal Society with a complete paper on the subject.

"I am not sure whether I have written to you since my continental travels to Paris and through Belgium and Holland, but I can hardly undertake to tell you of what I saw. The Paris Exhibition was very interesting, though rather hard work; and in fact, before I got home, I managed to do myself up pretty completely, and find myself now immensely better for a little quiet work at home.

"I have now made it a habit to walk about three hours a day, and as much as eight or even ten miles, and I take work in very moderate quantities, so that I can hardly fail to be well."

To his brother Herbert.

OWENS COLLEGE, 23*d October* 1867.

"I have a special reason for writing to you by this mail, as I have to tell you of my engagement to marry Harriet Taylor, the sister of Fred's wife. You have more than once advised me in your letters to take a step of this kind; and the fact is that, for some years past, ever since I had a fair prospect of an income, I have felt myself impelled towards it by every motive that ought to influence me. I have always been, more than any one, I think, in need of a wife and a quiet domestic life; and, to all appearances, I have now secured these great benefits. . . .

"I cannot look back upon the last eight years, since I came from Australia, nor indeed upon my earlier life, without feeling what a great deal I have to be thankful for, as everything seems ultimately to turn out as I should wish it.

"When I went to London for the second time I had everything to get, and no definite prospects whatever. No one can be fully aware what extreme anxiety and low spirits I frequently suffered, and what moderate and slow success I expected in the end. The life, of which I have now a prospect in Manchester, is perhaps as happy and suitable a one for me as I could easily imagine; and, if it may only last for a moderate lifetime, I feel confident that I can do all that I ever imagined to myself."

In his journal he writes :—

"19*th November* 1867.—A great change has come over my prospects, and I cannot express sufficiently the thankfulness I have felt at my happy prospects of marriage. I know now how right I was in thinking that the love of a wife, and the tranquillity of a home, were needful to me, if only to enable me to work better than before.

"I have always feared that I could hardly marry without sacrificing objects which have hitherto almost filled my soul. But, to my delight, Harriet is far from jealous of 'my old love,' my work. She promises to aid it, to join in it, to esteem it as her own, and to find a pride and gratification in it. Her good sense is surpassed only by her affection. From the bottom of my heart I thank my God for what seems to me sure to fill up my cup of usefulness and happiness in this world. Now, indeed, I have much to work for. It is new to me to feel that another's happiness is in my hands, and that I can make her happiness. I have not hitherto felt that the greatest efforts at kindness and sociability which I could make, appreciably added to others' happiness; with her it is far different.

"I have not much else to record. My mind was so unsettled during the summer that I found myself almost incapable of work. I spent the vacation first in London, in intolerable solitude—then for ten days at the Paris Exposition; then in Holland and in Belgium for a week or two. On getting back to Manchester I set rather hard to work at my new logic, reading a good deal for it and advancing well. I also commenced the final designs for my reasoning machine, and advertised for its construction. Just before the commencement of the session irresistible circumstances led me to the happy step which I hope will bring about my marriage this day month. Since then I have had a press of engagements, not unnaturally; to add to which I found it necessary to undertake a new course in political economy and statistics, to raise my afternoon class to more fair proportions, in which, at great cost of trouble, I have partially succeeded, having now seven students in place of two or three in previous years. This has led me temporarily to substitute statistical for logical work. My machine has struggled

forward as best it could under constant interruption, and I much fear now that much of it must be reconstructed before it can work properly."

On the 19th of December 1867 Mr. Jevons married Harriet Ann, third daughter of the late John Edward Taylor, Esq., of Manchester, founder and proprietor of the *Manchester Guardian* newspaper. The marriage took place at the Unitarian Chapel at Altrincham, near Manchester.

CHAPTER VIII.

1868–1872.

AFTER his marriage Mr. Jevons took a short tour with his wife to several of the cathedral towns in the south-west of England. He had a double attraction in visiting cathedrals, for, besides his enjoyment of the musical services, church architecture was a subject of much interest to him. Early in January they returned to the north, and spent a few weeks at Bowdon in Cheshire, until the house which Mr. Jevons had engaged, No. 36 Parsonage Road, Withington, was ready to receive them.

To his brother Herbert.

PARSONAGE ROAD, WITHINGTON,
MANCHESTER, 18*th April* 1868.

"We are now pretty well settled in our new house, and are enjoying a quiet Easter holiday at home, than which nothing can be more pleasant. We get breakfast about 9 A.M., then I work till 1.30 P.M. dinner; then a little more work till 4 P.M. Then we have a little gardening or a walk out till 6.30, and about 8 P.M. we have a little more work. Harriet does a great quantity of work for me, especially copying and arithmetical work, which relieves and helps me much. Our house satisfies us in nearly every way. It is very convenient and cheerful, and quite large enough. We have also a nice-sized garden, which I have begun to cultivate with considerable vigour. It furnishes me with a kind of exercise I have long wanted.

"I find a great deal to do between the engagements of married life and those of college, in addition to my own

work. On the 13th March I gave a lecture to the Royal Institution, London, on the Coal Question, which went off tolerably well, as I am told. I have also given a lecture[1] to some Trades' Unionists in Manchester, although very few came. I will, in a little time, send you copies of them.

"Next week I have to go to London to give evidence before the Commission on International Currency, and I am busy getting up a variety of things about coins."

On the 24th April Mr. Jevons went to London and gave evidence before the Royal Commission on International Coinage; and soon afterwards he read a paper to the Manchester Statistical Society on the "International Monetary Convention, and the Introduction of an International Currency into this Kingdom." About the same time he was appointed examiner in political economy in the University of London.

To his brother Herbert.

PARSONAGE ROAD, WITHINGTON,
MANCHESTER, 23*d June* 1868.

"We are now at the end of the session, the distribution [of prizes] taking place on Friday next. . . . I have been very busily engaged, the last two or three weeks, on my logical machine, having begun a new one altogether. I have now got it to work fairly, and there can be no doubt of my finishing it with success, although many little troubles arise in a new form of mechanism. I am thinking of exhibiting it—with a paper—to the Royal Society next session. The machine works in a few moments any logical problems involving no more than four distinct terms or things. It will be in appearance like a large accordion, or a very small piano, and has twenty-one keys, exactly like white piano keys."

Early in July, Mr. Jevons took his wife to visit his sister, Lucy (Mrs. Hutton), at Clynnog in North Wales; after spending a week there they went to stay at a farm-house near Beddgelert.

[1] A lecture on "Trade Societies, their Objects and Policy," delivered by request of the Trades' Unionists' Political Association.

To his sister Lucy.

CASTELL, NANT GWYNANT,
BEDDGELERT, 16*th July* 1868.

"We have established ourselves here very rapidly and easily, and are well pleased with what we see of the place as yet. The house is on the opposite side of Nant Gwynant to what I expected, but it is delightfully situated, so that Snowdon is straight before our windows. The clouds have cleared sufficiently to let us see the lower slopes, and as far as I can judge as yet, it is one of the most beautiful places we could have met with. The people here consist of a fine old man and a grown-up family of sons, and one daughter. If further acquaintance confirms my first impressions, we shall be lucky. As this is a farm with plenty of grass about, we shall have as much milk and eggs and poultry as we want, and we can send for meat to Beddgelert. A postman calls daily. . . . There is every prospect of our having a quiet time here.

"It is not easy to describe this place, but it stands among broken hills, some of them covered with woods. The house is just high enough to give us the feeling of being in the open mountain air. There is hardly another house in sight from the windows, but there is a sort of gentleman's house lower down among the woods, and in the bottom of the valley is Plas Gwynant, apparently a handsome residence.

"I am going to set to a little work now.

"*Friday Morning.*—This morning Snowdon is clear of clouds, and looks very fine, although we do not get quite the best view of him. We seem to be surrounded on all sides by peaks of hills; Moel Hebog, Moel Siabod, Iran, Lliwedd, seem to surround us with an infinity of lesser hills."

To his brother Herbert.

CASTELL, BEDDGELERT, 24*th July* 1868.

"I wrote pretty fully to you from Clynnog a week or two ago, but as I have since got your letter about gold refining, I write again without delay. I may say, first, that just a week ago we left Clynnog after a week's stay, and came to lodgings at a sort of farm-house in Nant Gwynant, four

miles from Beddgelert. It is about half a mile off the main road, up the hills opposite to Snowdon, so that we have a splendid view of the mountain just opposite our windows. For miles round the house, too, there is a beautiful succession of hills and rocks, from any of which you get a new and charming view. On the whole, I think this is the most charming place to stay at I ever saw, and I hope we may have four or five weeks here. A day or two ago Harriet and I climbed a high hill, or mountain, two miles or so, at the rear of the house where we were, at the head of the Dolwyddelan valley, and had a grand view, not only of the whole of that valley, but of nearly all the Welsh mountains. This afternoon we walked up Nant Gwynant nearly to Pen y Gwryd. We live here in a somewhat primitive way, chiefly upon milk and eggs and bread. Even our supplies of bread are rather precarious, but our lodgings are comfortable."

Whilst the afternoons were devoted to long walks or excursions, the mornings were chiefly spent in work. He was engaged in preparing his paper "On the Condition of the Metallic Currency of the United Kingdom," with the arithmetical work of which he made great progress during his stay at Castell. It was only occasionally that he would give himself a day's holiday. One of these was spent in the ascent of Snowdon, which he thus describes, in a letter dated the 4th August, to his sister Lucy :—

"Last Saturday we carried out our intended ascent of Snowdon, after waiting a good many days for suitable weather. We were very fortunate, for besides a fine view of nearly the whole of North Wales, we saw Ireland very clearly, both the Wicklow mountains and the More mountains to the north, also the Isle of Man. The clouds were also very beautiful at times. We are now planning an expedition to the top of the neighbouring hills to see the sun rise.

"The weather is so intensely hot that we hardly do anything out of doors now but bathe—for which we have a very pretty pool in the river close by. . . ."

In describing the ascent of Snowdon to his sister, Mr. Jevons did not tell her that, to shorten the descent, he proposed to his wife to return down the side of the mountain opposite to Castell instead of by one of the regular paths.

He had so accurately observed the mountain from below that he was sure he could find a way unattended by any difficulty or danger, and the result proved him correct; for, having lingered to watch the sunset, but a short distance from the summit, they reached the foot of the mountain before it was really dark.

Ten days later, this holiday was sadly ended by the sudden death of Mrs. Jevons's eldest sister, which recalled them to Manchester. The next three weeks were spent at home, after which the advisability of a little more change before the college session commenced induced them to pay a brief visit to the Isle of Man.

To his sister Henrietta.

BEACH HOUSE, RAMSAY, ISLE OF MAN,
Sunday, 6th September 1868.

"We have now got comfortably settled here for a few days, in a spacious house just on the beach, with wide bay windows, which give a fine view of the sea. When the tide goes down there are beautiful sands in front of the house; a quarter of a mile off fine rocky cliffs begin. There is also a good hill within a mile of the house, and, within three miles, a mountain called North Baroole, quite as high as Gern Didn, which we hope to ascend in a day or two. When we left Liverpool on Friday the weather was exceedingly fine, but out at sea a breeze sprang up with a nasty sea, which made many passengers ill. We got to Douglas about sunset, but preferred coming on to this quieter place, which we reached some time after dark. It is more like Beaumaris than any other place I have seen, but it is perhaps more dirty and irregular, and has not so good an hotel as the Bulkeley Arms. But the shore and the sea are beautifully clean, and very unlike the dirty irregular shore at Beaumaris. The bathing machines are very near the house, and we have both of us had a dip already. . . . We shall probably go on to the other parts of the island, which promises to be pretty and interesting, though, of course, there is nothing here to compare in grandeur with the neighbourhood of Snowdon."

During their stay at Ramsay Mr. Jevons completed, and read to his wife, three articles, in which he pointed out

some of the inconsistencies and contradictions which occur between different parts of Mill's *System of Logic.* These articles were sent to the editor of one of the leading magazines, and on his declining to publish them, Mr. Jevons laid them aside to be made use of on a future occasion.

To his brother Herbert.

PARSONAGE ROAD, WITHINGTON,
MANCHESTER, *20th November* 1868.

". . . I have just been one of my journeys to London, to read a paper to the Statistical Society on the Gold Currency. It is the result of a rather elaborate inquiry during the past nine months, which has proved rather successful, and is likely to prove useful, I think. I have some hope that when Mr. Gladstone is Premier, with a great majority at his back, he may give some attention to the subject.

". . . These journeys rather knock me up. I had three classes on Monday afternoon and evening, went to London on Tuesday morning, read the paper in the evening, and back on Wednesday for two classes in the evening. Now, a thing of this sort knocks me up for the rest of the week.

"About a month ago I gave two lectures, on successive evenings, at Newcastle, on coal, with fair audiences, but this thoroughly knocked me up. I cannot say my health is bad, but I have to take great care of myself, drink port wine occasionally, and take things as easily as possible. I never hear any complaints from you now, and hope that your health is stronger.

"I cannot tell you how happy Harriet and I are together . . ., so that I am altogether better off than I had any right to expect in this world."

In this paper on the condition of the Metallic Currency Mr. Jevons adopted a novel and ingenious method of estimating the amount of gold coinage in circulation in the United Kingdom, and his estimate was at once accepted as probably the most accurate that had been ever made. He also strongly pointed out the need for a re-coinage, owing to the defective weight of so many of the sovereigns and half-sovereigns. The paper was illustrated by two large diagrams which he had drawn himself.

After his marriage Mr. Jevons was not quite so averse to going into society as he had previously been, but he had neither inclination nor time to spare for much of it. He liked far better to have a friend or two at his own house for a quiet talk on some of the many subjects which interested him. He was a very good listener, and always gave attentive consideration to any objections raised by a companion to his own view of whatever subject they were discussing.

The evening classes at Owens College occupied two evenings a week during the winter, and when he needed recreation, what he most enjoyed was to attend one of Hallé's delightful concerts. In February and March 1869 he gave a course of lectures on political economy to working men at Hyde, near Manchester. Some influential gentlemen of that neighbourhood desired that a course of such lectures should be given, and when they asked Mr. Jevons' help he would not refuse it, for no one felt more strongly than he did the need of extending the teaching of political economy to the working classes. But these evening lectures once a week, at such a distance from home, in addition to his evenings at Owens College, proved an unwise tax upon his strength.

Having been consulted by the Chancellor of the Exchequer as to the pressure of taxation upon different classes of the people, Mr. Jevons sent to him, on the 13th March, a report, which he had prepared with much care. The result of his inquiries was, that the artisan, with only a moderate use of beer and tobacco, was less heavily taxed than the classes above or below him, but that the labourer, if he only moderately indulged in stimulants, was rather the most heavily taxed of any class in proportion to his income. Mr. Jevons therefore recommended the repeal of the remaining duty of a shilling a quarter upon corn, which he believed formed an appreciable burden of about one per cent of income upon the very poorest class on the borders of pauperism. He was gratified to find that the Chancellor of the Exchequer concurred in this opinion, and proposed the repeal of the duty in his next budget.

During the winter of 1868-69 Mr. Jevons' thoughts were much occupied with logic. He had already planned a large portion of his great work, *The Principles of Science*,

and it was in 1868 that he decided upon the title of the book; but as such an undertaking could not be completed for some years, he decided to present at once a sketch of his fundamental doctrine. This he did in a small book entitled *The Substitution of Similars, The True Principle of Reasoning, Derived from a Modification of Aristotle's Dictum.* In the preface he thus explains the purpose of the book: "In this small treatise I wish to submit to the judgment of those interested in logical science a notion which has often forced itself upon my mind during the last few years. 'All acts of reasoning seem to me to be different cases of one uniform process, which may, perhaps, be best described as the *substitution of similars.* This phrase clearly expresses that familiar mode in which we continually argue by analogy *from like to like,* and take one thing as a representative of another. The chief difficulty consists in showing that all the forms of the old logic, as well as the fundamental rules of mathematical reasoning, may be explained upon the same principle; and it is to this difficult task I have devoted the most attention. . . . Should my notion be true, a vast mass of technicalities may be swept from our logical text-books, and yet the small remaining part of logical doctrine will prove far more useful than all the learning of the Schoolmen."

He had also been engaged upon the completion of his logical machine, which was sufficiently finished to work correctly before the *Substitution of Similars* was published (June 1869).

At Easter 1869 Mr. Jevons and his wife spent a few days at Ludlow, where Mr. and Mrs. John Hutton were then living; afterwards they stayed a week or two at Church Stretton in the same county, where Mr. Jevons enjoyed daily walks over the hills.

In June, as soon as the session ended at Owens College, he went with his wife to London for two or three weeks, to fulfil his duties as examiner in political economy at the University of London. He took lodgings in the neighbourhood of the British Museum Library, where a good deal of his spare time was passed.

To his brother Herbert.

18 KEPPEL STREET, RUSSELL SQUARE,
LONDON, *7th July* 1869.

". . . My sovereign research has been more successful than I expected. The Chancellor of the Exchequer has adopted the notion, and quoted some of my figures in the House of Commons lately; and he has had a report prepared partly based upon my figures. I do not know whether he will succeed in carrying any change through, but I should not wonder if he makes some attempt next session. At present the Irish Church stops the way. I was much pleased to get the return of New Zealand sovereigns which you prepared."

A day or two after this letter was written, Mr. Jevons and his wife went abroad intending to go by the Rhine to Switzerland, and after a short stay in the Engadine, to proceed to the Tyrol and Vienna. His health was far from satisfactory. In addition to overwork he had suffered much during the spring from private anxieties, and a complete change of scene and rest from work seemed desirable; but the proposed route proved an ill-advised one. The weather became intensely hot just before they left London, and on the Rhine it was almost unbearable. By the time they reached Heidelberg Mr. Jevons was rendered quite ill by it, and for several days could not proceed farther. They then went on to the Engadine; but though the cool bracing air did him good, he was so weak and unfit for the exertion of much travelling, that the visit to the Tyrol and Vienna was reluctantly abandoned, and they decided to return home, travelling slowly, and spending a few days at more than one place *en route.*

To his sister Lucy.

WITHINGTON,
Sunday, 15th August 1869.

". . . I think I wrote to you last from Linththal. After spending several pleasant days there we went back to Zürich; thence by the lake of Zug to the Rigi mountain, at the top of which we spent one night. We were disappointed in the view of the Alps; but there was a great quantity of clouds

about, and frequent lightning. From the Rigi we proceeded to Lucerne, and stayed there three days, rowing about the lake, hearing the organs, and making the round of the lake in the steamboat. We stayed at the Englischer Hof. We returned by way of France, stopping one night at Mulhouse, and then reaching Paris. As we found the weather quite cool and pleasant, we decided to stay a day or two, in order that Harriet might see the Louvre and some of the sights of Paris. We did not do very much, but still had a pleasant time, living at the Hôtel Meurice. We were landed at Dover at 3 A.M. yesterday, and had to spend three hours walking about the pier and stations until the train left at 6 A.M."

To his sister Lucy.

WITHINGTON, 1*st September* 1869.

". . . We shall only be going to Llandudno for a few days near the end of this month, so that we are in reality settled at home for the session. Travelling does not agree with me, on account of the irregularity of meals and exertion. This next session I am only going into town three days a week. . . .

"I have been working chiefly at my logical machine since I came home; and it is now as good as finished, and works nicely. It is something like a cross between a small piano and one of the old barrel organs.

"We are spending my birthday in a very quiet way at home, reading, writing, touching up the machine, and especially mowing our grass, which is a perpetual occupation here."

To his brother Tom.

WITHINGTON,
MANCHESTER, 10*th October* 1869.

". . . I am in better spirits about my health; the distressing giddiness seems to be going away, and I can do work again with comfort. . . .

"I have quite finished my paper for the Royal Society on the machine, and have it ready to post. The machine itself is gone to be French polished and have a travelling case made, and with a few last touches will be quite done. I

think, however, that it is quite as likely to be laughed at as admired.

"My garden is improving by degrees, and becoming very interesting; and as I now only go into town three days a week, I have time to spend upon it, and the exercise is very healthy."

Mr. Jevons had the pleasure of being appointed president, for the winter session 1869-70, of the Manchester Statistical Society, and in October he gave his inaugural address, "On the Work of the Society in Connection with the Questions of the Day. I. Stagnation of Trade. II. Commercial Fluctuations. III. Pauperism, and the Means of decreasing it. IV. Medical and other Charities."

In January 1870 he went to London to read a paper "On the Mechanical Performance of Logical Inference" before the Royal Society, and to exhibit to them his logical machine.

During this winter he sent several contributions to *Nature;* but he was chiefly engaged in the preparation of his *Elementary Lessons in Logic* for Macmillan's series of science class-books. He found a recreation in his leisure hours in making a series of experiments on the movements of particles suspended in liquids; and on the 25th January he contributed to the Manchester Literary and Philosophical Society a brief paper "On the so-called Molecular Movement of Microscopic Particles." To the same society he also read, about that time, a more elaborate paper "On a General System of Numerically-Definite Reasoning."

On the 5th April 1870 he went to London to give a lecture on Industrial Partnerships, delivered under the auspices of the National Association for the Promotion of Social Science. He had undertaken with much pleasure to prepare the lecture, because, to use his own words, he became "more and more convinced of the extreme importance of the Industrial Partnership principle to the peace and well-being of the kingdom."

These hurried visits to London were a great tax upon his strength, for he was so scrupulous that other engagements should not interfere with his lectures at college that he would go through almost any amount of fatigue rather

than fail to meet his class at the appointed time. At Easter he took a brief holiday, which he spent with his wife at Baslow, a little village at the higher end of Chatsworth Park, in Derbyshire.

In the spring of 1870 Mr. Thomas E. Jevons was married to Miss Seton of New York, and he spent the summer with his wife in England, so that the brothers had the pleasure of being a good deal together. Mr. Jevons again stayed two or three weeks in London at the time of the examinations for the M.A. degree, and the rest of the long vacation was spent partly at home and partly at the seaside, and in visiting friends. In September he had the honour of being President of Section F (Economic Science and Statistics) of the British Association, and it was an additional pleasure to him that the meeting took place in Liverpool, his native town.

In October the *Elementary Lessons in Logic* appeared, and it was at once generally adopted as a text-book. It is now so well known as hardly to need description. As it was designed for a class-book, he "throughout devoted more attention to describing clearly and simply the doctrines in which logicians generally agree than to discussing the points in which there is a difference of opinion."

In December Mr. Jevons aided in drawing up a memorial to the Home Secretary as to uniformity in the census of 1871, a committee having been formed for this purpose at the meeting of the statistical section of the British Association in Liverpool.

During the winter of 1870-71, in addition to his classes at Owens College, he delivered, by request, a course of lectures on logic to ladies, the class meeting once a week. For the last three or four years Mr. Jevons' thoughts had been mainly occupied with logic, but during this winter he returned with renewed interest to political economy, and devoted himself entirely to the writing of *The Theory of Political Economy*. The work was of such absorbing interest to him that he made rapid progress with it, to the detriment of his health, as it afterwards proved.

From the time when he had played his grandfather's organ as a boy, Mr. Jevons had availed himself of every

opportunity of playing on the organ, and he now fulfilled the wish that he had long had of possessing one of his own. On the 14th February 1871 he thus describes it to his sister Lucy: "I am much occupied with my new organ, which is a charming instrument. It has two rows of keys, with pedals, and separate pedal pipes, seven stops, four in the swell organ and three in the other, with three coupling stops for connecting the several parts together at will. It is to cost £133, which is not much for so complete a little organ. I hope I may keep it the rest of my life, as I need something to distract my mind from logic."

When the census took place, on the 1st April 1871, Mr. Jevons volunteered to collect the papers in one of the poorest districts in Manchester. He was anxious to see for himself how much the people comprehended the purpose of the census papers, and he was glad also to have an opportunity of visiting many of their houses.

By the time Easter came he felt the need of a little holiday, and he went with his wife to Clapham, in Yorkshire, a neighbourhood which he had previously visited, and which he had enjoyed so much that he desired to show it to his wife. The bracing air did him good, and they made the ascent of Ingleborough. He always went by choice to a hilly country, and climbed to the highest points in the neighbourhood whenever his strength permitted it.

It was in his budget of this year that Mr. Lowe, then Chancellor of the Exchequer, proposed the match tax, which was received with such an indignant outcry by the press and the people that it was abandoned. In June Mr. Jevons published a pamphlet—"The Match Tax; a Problem in Finance"—in which he calmly considered the most important objections raised to the tax, pointing out how many of them had been unreasonable, and proving that even to the very poor the match tax would have been less than one-third the burden which the shilling corn duty, repealed in 1869, had been.

At the beginning of the long vacation Mr. Jevons paid his annual visit to London, combining some reading at the British Museum with his duties as examiner at the University of London. He attended the meeting of the Statistical

Society, which took place whilst he was in town, and to this the following letter refers.

To Hyde Clarke, Esq.

13 MONTAGUE STREET, RUSSELL SQUARE, W.C.,
24th June 1871.

"I have only just received your note, forwarded from Manchester. The remarks you mention are, I presume, those concerning the distribution of the Celtic population which prevailed towards the west and north-west. Isaac Taylor, in his interesting book, *Words and Places*, gave, as perhaps you know, a good deal of information on the point, and I think you would find some correspondence with your own results concerning intellectual ability. I should think that the difference between the East and West of Scotland, remarked at the meeting, would be due to the same circumstances.

"If there is time for you to add a note or paragraph to your paper, you had perhaps better verify independently what I have said, as it was only just on the spur of the moment the remark occurred, and I should prefer not to be responsible for it.

"The comparison of races is no doubt an invidious task, which might sometimes lead to trouble, but I do not see that in statistical inquiries you can suppress plain facts. I think that in legislation relating to different parts of the United Kingdom it is always well to be reminded that there may be distinctly different races to be dealt with, and the more the mixture of races can be promoted the better."

For the latter part of his holiday Mr. Jevons had planned a tour in Ireland with his wife. He had never been there, and much desired to visit the country, but he felt so unwell that he disliked the exertion of travelling, and the month was spent quietly in North Wales instead. When he returned to Manchester at the commencement of the session his health had somewhat improved, though it was not fit for the hard work which he proposed for himself during the winter.

In October 1871 *The Theory of Political Economy* was published. In this treatise he had fully developed the

theory, the chief points of which had been sketched ten years before in the paper read at the British Association meeting at Cambridge in 1862, and published in the journal of the Statistical Society in 1866.

The theory was purely mathematical in character. To Mr. Jevons it seemed perfectly clear that "economy, if it is to be a science at all, must be a mathematical one . . . simply because it deals in quantities. Wherever the things treated are capable of being *more or less* in magnitude, there the laws and relations must be mathematical in nature." To quote his own words again: "The theory consists in applying the differential calculus to the familiar notions of wealth, utility, value, demand, supply, capital, interest, labour, and all the other notions belonging to the daily operations of industry. As the complete theory of almost every other science involves the use of that calculus, so we cannot have a true theory of political economy without its aid." In all Mr. Jevons' previous statistical writings he had done what was in his power towards making political economy an exact science. In a later part of the Introduction he says: "I know not when we shall have a perfect system of statistics, but the want of it is the only insuperable obstacle in the way of making political economy an exact science. In the absence of complete statistics the science will not be less mathematical, though it will be infinitely less useful than if, comparatively speaking, exact. A correct theory is the first step towards improvement, by showing what we need and what we might accomplish."

Mr. Jevons had already at intervals made some progress in writing *The Principles of Science;* he now intended to devote himself entirely to its completion, to the exclusion of other work, except that attached to his professorship. His mornings were always spent at home, and he had at least three hours' work in his study. Directly after lunch, on three days in the week, he went to Owens College, and gave lectures during the afternoon. On two days in the week he lectured in the evening also. As he lectured with only notes before him, he always felt the hour's lecture a considerable effort and he used to say that he envied the professors of the physical sciences, who could occupy a part of their time

in showing experiments to their students. But the evening lectures were those from which he suffered most. He was very susceptible to close, hot rooms, and in the old house in Quay Street, which Owens College occupied until its present buildings were completed in 1873, the rooms were imperfectly ventilated, and by the time evening came, with the addition of gas, they were almost unbearable to him. This winter the evening lectures tried him more than they had done in previous years. One of his friends, who lectured at the college on the same evening, remarked that he often seemed perfectly exhausted at the close of them, but he would not give in. The class that fatigued him most of all was a large and somewhat unruly class of pupil teachers from the elementary schools in Manchester; for when the Cobden professorship of political economy was endowed, it had been arranged that free teaching was to be given by the professor to a class of pupil teachers. There were a few really good pupils amongst them, but as the majority did not care to learn, it required great effort to keep their attention fixed during the hour's lesson. What made the evening work particularly bad for him, was that any over fatigue or excitement at night prevented his sleeping, so that he was not really fit for his morning's work next day.

Until Christmas, however, he continued his usual amount of work, and made considerable progress with his *Principles of Science*. He contributed a paper during this winter to the Manchester Literary and Philosophical Society, "On the Inverse or Inductive Logical Problem;" he also gave a course of lectures to ladies on political economy, and he was quite unaware, till the close of the year, how much his health was giving way.

CHAPTER IX.

1872–1874.

To his sister Lucy.

PARSONAGE ROAD, WITHINGTON,
20th March 1872.

". . . DR. MORGAN says I must take a good long holiday, and that in a few months I shall be quite strong again. Early next week we are going to the Lakes for two weeks, and I shall then probably be quite well enough to complete next term, which is a comparatively very easy one. It is the evening classes that I believe injure me, as I sometimes feel quite done up with them, but now they are fortunately at an end. Harriet and I have almost come to the conclusion, hastened by my present state, to leave Manchester and go and live quietly and economically in or near London. I fear that I shall always be liable to this sort of over-fatigue as long as I have evening classes. Harriet is quite desirous of leaving Manchester now that almost all her relatives have left, and I think it would ultimately be of great advantage to me to be in London."

On the 6th April he wrote again to his sister:—

"I got your letter this morning from Grange. We came back from there somewhat in a hurry, as Harriet has informed you. I did not find myself so well there, and did not like being away from my doctor. I suffer from weakness brought on, I think, chiefly by over-work during the past winter, and no doubt complete rest during the summer will restore me. I have quite decided to discontinue the college work for the present at all events, and they will have to find a substitute. Whether I shall resign altogether need hardly

be decided just yet. If there seems a prospect of my being much better and stronger I might possibly continue. . . . We liked exceedingly what little we saw of Grange—it rained during several of the days, and we did not get about at all, but the mountains looked beautiful, especially on the day we left."

Mr. Jevons' illness was characterised by great inability to sleep, and this, instead of improving with the pure air and quiet of the country, became so much worse at Grange that he had to return home for immediate advice. It was so hard for him to keep his mind from working actively during the day that loss of rest at night told more upon him than upon most people. The month that followed was one of much suffering, mental as well as bodily, for he could not keep his thoughts from dwelling on his half-written book, the *Principles of Science*, and he often feared that he should never live to finish it. As soon as he was sufficiently recovered to leave home he went to Ludlow, where his sister was then living.

On the 12th May he wrote from Ludlow to his brother Herbert:—

"Harriet and I are now on a visit here of a week or ten days.

"I have been rather more ill than I like to think of. It commenced shortly after Christmas by indigestion and sleeplessness, and although I managed to carry on my college work until Easter, my doctor then ordered me to leave off all work whatever; I seem to have exhausted my nervous system by over-work, so that any exertion disarranges my digestion and heart, but after some sharp treatment, involving several weeks in bed, or in the house, I think I am coming all right again. I shall have to spend the next three or four months as a perfect holiday, and we have various plans as to what to do; not unlikely we shall go to Norway.

"I am to be one of the fifteen new members of the Royal Society elected this year, and Harry Roscoe informs me that in the ballot by the council I came out at, or very near, the top of the list."

After several weeks' rest and change of air at various

places, Mr. Jevons was well enough to get through his duties as examiner for the London M.A. degree, and then returned home to make arrangements for a long tour with his wife in Norway. He was still so very far from well that it seemed rather a rash experiment going so far away, and so much out of the reach of medical advice, but as he was quite unfit for writing, it was most necessary to choose some place where work would be out of the question, and where his active mind would be occupied and interested with the novelty of his surroundings. They sailed from Hull to Christiansand in the first week of July, having a sea so smooth the whole way, that the captain told them it might be fifty years before there was another passage like it.

To his sister Lucy.

BERGEN, *12th July* 1872.

"I daresay you will like to hear from me how we are getting on, although you may have had some details in Harriet's letter, which I asked to have sent on to you. We left Christiansand yesterday morning at 7 A.M. after a brief night of four or five hours' sleep, obtained with some difficulty, owing to the noise of horses, dogs, and people. The day's journey was, for the most part, very agreeable, the steamer passing among an infinity of islands, and stopping every few hours at a small town or village of pretty bright-coloured wooden houses, usually built at the very edge of the water. These houses were almost entirely occupied by fishermen, and at one or two of the larger places, especially Haugesund, the herring-fishing is largely carried on, and there were a vast number of the picturesque warehouses at the water edge, where they cure the herrings, make the barrels, and store them.

"The fiords which we passed through in this part of the coast are not grand, as the rocks seldom rise, I should think, above 1500 or 2000 feet, and are generally low; they are devoid of trees, and almost of vegetation. Yet the infinite variety of shaped islands and channels, with beautiful blue water, and occasional views of the open sea, made very pleasant scenery. If you can imagine steaming for two days through the Menai Straits, devoided of its bridges, and

with only distant views of snowy mountains, you will have a fair idea of fiord scenery as far as we have yet seen it.

"My chief difficulty has been want of sleep, as the steamboats almost invariably depart or arrive in the middle of the night. Even when we had a clear night in the *Hero* between Hull and Christiansand, we were kept awake for two or three hours by the dreadful steam whistle, which was far from needless, however, as we were nearly run into by another steamer in a fog. The *Arendal*, in which we came from Christiansand, was a small boat crowded with baggage and native passengers of various grades. There were frightful vibrations from the engine and screw, and no proper berths, but only couches in a close-crowded cabin. I managed to get a few hours' sleep before we arrived, about 4 A.M., at Stavanger, a principal town, where we remained changing cargo and passengers until 7 A.M. Added to other discomforts was a slight amount of sea sickness, arising from occasional breaks in the chain of islands, where we got a fair amount of rolling and pitching. . . . Yesterday, our second day among the fiords, made me so sleepy that I dosed and nodded about the deck all day, and last night I slept in spite of all the cocks of Bergen, which appeared to be doing their best shortly after midnight. With Bergen itself we are perfectly charmed. It lies in the corner of a splendid fiord, and at the foot of a range of mountains. The town runs round the sides and ends of a natural basin, which forms the principal part of the harbour. The houses here are various and quaint in form, the streets narrow and devious, and there are many marks of antiquity. Many of the women are dressed in peculiar costumes, and have ingenious headdresses unseen elsewhere. Altogether the place has a thoroughly Norwegian appearance; and when we are able in the cool of the evening to walk about, I daresay we shall see much more that is interesting. Although there is none of the luxury which one meets in Switzerland or some other fashionable places, we find everybody very attentive to our comforts, and exceedingly civil. The language presents but little difficulty. We find about a dozen Norse words very useful, such as *tak* = thanks, *vand* = water, *smör* = butter, *brod* = bread, *bla* = ale, and so on. A great many people

know a little English, and when both fail, a few words of German are pretty sure to be understood. A good deal of Norwegian is pronounced more like the English than it is spelt. For instance, you hear people saying '*God morgen*' indistinguishably from our 'Good morning;' and there is no mistaking such sentences as '*Vad kan de giv os til aftens?*' (supper).

"As regards victuals I have made myself ill two or three times, as my curiosity gets the better of my prudence; but the fine air, which is certainly of the best quality and full of ozone, has helped me through. If it is true that fish is good for the nerves and brain, I am likely to return restored indeed, for the fresh-herrings, trout, salmon, and anchovies are never wanting, and are beautiful to eat. Last night we had portions of the most magnificent lobster I ever saw. We shall probably leave here by a steamboat at 1 A.M. on Sunday morning for Trondhjem and Tromsö in the north; a great inducement being the splendid cool air and the smooth water of the coast fiords through which we shall pass. On returning to Bergen we shall perhaps go up one or two of the great inland fiords where the grandest scenery is; then cross by land to Christiania, and possibly visit Copenhagen before returning from Gothenburg to Hull.

"*Saturday, 13th July.*—It is very hot here to-day, and though not so oppressively so as on a hot English summer day, yet it is more than we like, and the sun is very powerful. They have had fine weather here for six weeks at least, and with our usual luck we find that we have come in for one of the hottest summers that they have had of late years. We have decided to leave for Trondhjem at one to-night, and shall try to keep as much at sea as possible for the present. This morning we obtained one of the few vehicles for two persons existing in the town, and drove to the fish-market, the post-office, and the museum. The fish-market is considered one of the sights of the place, and was chiefly carried on by bargaining between the women on the quays and the men in the boats—the fish and money being handed about in the most inconvenient manner. We had a good view too of the *jacgts* or yachts, which are fishing-boats from the extreme north, built in the identical shape familiar to the

old vikings, with a very high stern and prow, and a single mast planted just in the middle of the vessel bearing a single large yard and sail. These vessels remind me of the boats figured in old pictures and on old coins. The museum contains many antiquities worth seeing. Afterwards we had a beautiful row round the parts of the fiord making the harbour."

To his sister Lucy.

BERGEN, *Tuesday, 6th August* 1872.

"We have now got back to Bergen, and I have had the pleasure of receiving your letter of 22d July, everything in which is satisfactory. Harriet has also had two letters, which have pleased her much, being the first which have reached us since leaving England.

"On leaving Bergen after our first visit we proceeded to the north by a fine coasting steamboat. On the way it suddenly turned cold and wet, and the weather has since been very cold. Most people would regret the previous fine warm weather, but the cold suits my health best; and when I hear of the recent great heat in England I think myself very fortunate in being away from it.

"I now begin to feel more in the way of recovering from my state of weakness. On two or three recent occasions I have been far from well, and I am hardly able to walk yet more than I did at Ludlow; but I am beginning to sleep in a much more satisfactory manner, and my digestion is better, so that I hope to be soon stronger. . . .

"At Trondhjem we stayed four days waiting for a return steamboat; but we were much disappointed in the town, which, although the ancient capital of Norway, contains few things of interest. We came south again as far as Molde, on the way to the celebrated Romsdal. From Molde, which is on the shore of a fine fiord, we had a grand view of the surrounding ranges of mountains, covered here and there with patches of snow, and looking almost Alpine in character. But it is in the Romsdal itself that we have seen the grandest scenery as yet. Four or five hours' journey up the Romsdal Fiord on a small steamboat was very enjoyable. In the higher part of the fiord vast rocks rose almost straight out

of the green water to the height of 2000 or 3000 feet; and up every opening were glimpses of still higher mountains in the distance. The forms of the mountains are wonderfully varied, and in some places they rise into snow-covered peaks. If you pick out the finest bits of scenery in Wales or Scotland, and then imagine yourself travelling for days and weeks amidst a constant succession of such scenes, always varied in character, you get some notion of the country we are in.

'"The drive of three miles up the Romsdal brought us to the well-known Aak Hotel; and after passing one night in a comfortable farm-house in the neighbourhood, we obtained a cheerful pleasant room in the hotel, and were induced to stay two weeks there. This hotel is beautifully situated in the wider part of the Romsdal valley, and two or three miles from the magnificent gorge at the foot of the Romsdal horn. It is difficult to give you any idea of this mountain, which rises almost perpendicularly from the sea level to a height of more than 5000 feet, and terminates in a rounded horn or peak, which has never been ascended. We have watched it for many days in all varieties of weather, but I think it perhaps looked most beautiful of all when the topmost point peeped through the clouds. Curiously enough there is at the very top a large rock or boulder, which is generally supposed to be a cairn raised by some person who had climbed the horn; but this is proved to be mistaken. On the other side of the gorge is a frightful range of precipices terminating at the summit in jagged points of rock known as the *Troltinderne*, or the Witches' Peaks. We drove through this splendid part of the valley on two occasions; and on one of them went about twenty miles, to one of the small posting inns or *skyds*-stations called Ormein. The valley, though less remarkable and grand in the higher parts, presents a constant succession of beautiful views. This journey was our first attempt at cariole travelling. You would be amused if you could see Harriet and myself in two very small, light vehicles trotting away among the rocks and precipices and over Alpine bridges. We are already expert enough in driving ourselves, and in fact the horses, or rather the ponies

—for they are seldom larger than ponies—are so well-trained and accustomed to the roads that they hardly require driving. One day we drove in carioles up a side valley where an English carriage would have come to grief half a dozen times. On this occasion we visited the sœter (sätér) or out farm of the hotel where most of the cows are sent during summer; but we have not seen any mountain sœters yet, as they are generally beyond the reach of any carriage road.

"At the Hotel Aak (pronounced Oak) we spent an agreeable indolent life, reading novels, of which there was a good supply, driving out in the evenings, and lying on the grass in the mornings. The English tourists in Norway, too, are often agreeable company. In the hotel they varied in number, from three or four to eighteen or twenty, but occasionally there were parties to which we objected. The Norwegian tourists are usually of a superior class to those encountered in Switzerland and France, and we have liked many of them very well. A young American, who has been travelling for three years in many parts of Europe, was our most constant companion, and amused us much. At the latter end of the time, too, Dr. Frankland, the former professor of chemistry at Owens College, came to fish, and I was glad to become better acquainted with him than before.

"We stay here until Thursday, when a steamboat leaves for the great Hardanger Fiord. After visiting several parts of that, we shall cross by land to the Sogne Fiord, and afterwards we hope to get across the country by carioles to Christiania. As there is sometimes a difficulty in getting good meals, and meals are important to me, we are setting up a beautiful provision basket, full of biscuits, preserved meat, brandy, etc.

"If all goes well, I think we shall not return to England until the middle of September, by which time I hope to be much better."

To his sister Lucy.

VOSSEVANGEN, *17th August* 1872.

"Having abundant spare time here, I propose to tell you briefly about our travels since I last wrote to you at Bergen.

We are now spending several days in a rather comfortable and well-known hotel in a village or small town about twenty-four hours' journey from Bergen. It is at one end of a fresh-water lake, the Vangs Vand, which appears to be about two miles long, but really extends three or four miles farther, out of sight. The mountains slope up from the water in a comparatively mild manner, and the farms and farm-houses extend half-way up them, so that the view is pleasing and pretty rather than grand. The lake is not altogether unlike Bala Lake, though the mountains even here are higher than any visible there. As there is a boat at the water's edge ready for us at any moment, we occasionally take a row, and we get a boy to row us some distance, and then take a walk.

"We left Bergen at 9 A.M. by a fine steamboat for the Hardanger Fiord, and after proceeding for several hours down the coast, reached the mouth of that fiord, up which it took the rest of the day to steam. The scenery was always pleasing, but became more and more grand as we approached the higher parts. As we did not wish to spend a wretched sleepless night on board the vessel, we landed about eleven o'clock at a village called Utne. This landing was the least pleasant one we have had, as the boat was loaded with luggage and goods, and with about a score of passengers, many of whom sat high up upon the pile of goods. The next morning we took a row-boat, and went about three miles, so as to meet the steamboat again, which had, in the meantime, been going up and down some of the branches of the fiord. We had then a splendid sail of three hours down the Sör Fiord, a long narrow branch of the Hardanger, the lofty mountains on either side sloping steeply down into the water in a succession of headlands, and covered on one side by fields of snow and small glaciers. On reaching Odde, the village at the end of the fiord, we had our first serious trouble about accommodation, as there was a sudden concourse of tourists, and we could only get a very small bedroom, just sufficient to contain the usual two small beds, with two doors opening respectively into the eating-room and kitchen. Our companions here, consisting of one exceedingly tall Norsk gentleman (how he got into

the beds is a point that can never be explained), and several parties of English tourists, were by no means agreeable, and we had the misfortune to meet four grown-up boys, whom other tourists described as 'rowdies,' and who behaved altogether so disgracefully that it has been a principal object of our arrangements, ever since, to avoid them.

"Odde, however, proved to be a beautiful place. A mile above the village was a fine lake three or four miles long, so closely surrounded by mountainous precipices that a boat across the lake was the only mode of proceeding farther. On one side was a narrow valley, terminating in a beautiful glacier, which, by the aid of a pony, we managed to reach. The ice was hollowed out into a series of fantastic caverns of the finest azure colour, exceeding anything I had seen in Switzerland. Another day we spent in a glorious ride to a place about twelve miles up the main valley, beyond the lake, the views being equally grand and lovely.

"In spite of its beauty, we were not sorry when the steamer came to carry us from Odde to Eide, where we had a comfortable inn nearly to ourselves, but no very grand scenery; little to do, in fact, but watch the netting of salmon. After stopping two days, a drive of three hours with a capital horse brought us here."

GUDVANGEN.

"After staying four days at Vossevangen, we came on yesterday, and enjoyed a sight of the most beautiful scenery perhaps which we have yet met with. The drive of twenty-eight or thirty miles is said, indeed, to be unparalleled for beauty in Norway, and I doubt if it is to be exceeded elsewhere. During the first three stages of about seven miles each, we passed a succession of lakes, surrounded by pine forests, sloping hills, with groups of wooden farm-houses, rocks, with every variety of waterfalls, the view being generally closed by lofty mountains, diversified with patches of snow. But it was when commencing the last stage at Stalheim that we came in sight, all at once, of the celebrated Nœrodal. The road here attained a height of 1000 feet or more, and there were rounded mountains with peculiar white rocky summits towering up above us, when at a turn in the road we saw the Nœro Valley, a long narrow gorge, with

nearly perpendicular rocks of 5000 or 6000 feet in height running away out of sight. We have a photograph of this valley, which will give you some idea of its beauty. Gudvangen is a small village lying six or seven miles down the valley, at the point where the Nœro Fiord commences, which is but a continuation of the valley filled with sea water. On the way there was much besides the scenery to amuse us. In the first stage we had two good horses and carioles, and enjoyed a good trot, which down some of the hills became so rapid as to make one quite dizzy. But at the first station, or posting-house, we were disgusted to meet a party who had ordered twelve horses, while only six were available. We were glad to put up with two return horses and stolkœrres (or little carts). For the third stage only one stolkœrre and horse could be got, and at the last stage we degenerated to such an old horse and rickety cart that trotting down hill appeared highly dangerous, and we descended a long series of zigzags on foot. The stations are supposed to be little inns, where, on an emergency, one might have to sleep, but on this journey they were most wretched wooden huts, in which one hardly liked to put one's nose. At one place we tried to get tea with the aid of our provision basket. Though we had plenty of tea, we could get nothing better as a tea-pot than a large saucepan, with boiling water at the bottom. When we asked for milk, a bowl of it appeared, which proved, however, to be sourer than butter-milk. When we tried to get some sugar, which we had forgotten to bring, the kindness of the villagers produced some sugar-candy. As there were no eggs, bread, meat, or anything else, our meal resolved itself into some dry tongue and biscuits which we had with us.

"We are now spending a leisure day at a comfortable hotel in Gudvangen, a village so shut in by lofty rocks, of which it is impossible to estimate the height, that the sun was not visible till nine o'clock. Just opposite the hotel are three cascades, which fall over the cliffs close together, descending in a succession of beautiful curves and streams of spray, many hundred feet at a bound.

"To-morrow, about noon, we go by steamboat down the Nœro Fiord, and up another branch of the Sogne Fiord to

Lœrdal, and, with the splendid weather which we now enjoy, we must have a glorious view.

"We now think of returning to England by a steamboat about the 6th September, but it may possibly be the 13th. I feel at times a good deal better, but every now and then have a return of the old symptoms, so that I fear undertaking any fixed work at present."

To his sister Lucy.

HULL, *9th September* 1872.

"I am glad to say that we have returned safely to England, and hope to be at home to-night. We got to Hull about 8.30 last night, by the *Rollo* steamer from Gothenburg, and stayed the night at Mr. Hunt's, a relative and friend of ours. The *Rollo* is a fine steamboat, with the first cabin in the middle of the vessel, so that we felt the motion very little, and Harriet seems none the worse; indeed, for a large part of the way, the sea was quite smooth. The voyage occupied about fifty hours. The final parts of our tour consisted of a visit of about five days to Christiania, but as the weather was often rainy, and we were tired after our cariole journey, we did little but rest ourselves at a very comfortable hotel. Then we went overland by railway to Gothenburg in Sweden, a journey of eighteen hours, by the express train. We were much amused by this train, which, although an express mail train, with a travelling post-office, stopped about five minutes at most of the stations, and finally stopped for the night at a little Swedish town, where all the passengers, about a dozen in number, went to an hotel and had a comfortable night's rest, starting again at seven in the morning. We were interested by what we saw of Sweden and the Swedes, and much pleased with Gothenburg, which, although a busy and rising port, is also a clean and beautifully-built town. The scenery in Sweden is of a poor kind, excepting pretty little views of the innumerable lakes with flat shores.

To his brother Herbert.

PARSONAGE ROAD, WITHINGTON,
15th October 1872.

". . . We are now settled quietly at home after our

splendid tour of two months in Norway. My health was so far improved that I was recommended by my doctor to undertake the day classes, leaving the evening classes to a substitute, and I have some hopes that, with great care, I may get through the session. If I break down again you may expect to see us in New Zealand.

"I am not sure that I have written to you since we went to Norway, and I should like to tell you a good deal about our journey, our driving in a pair of carioles for hundreds of miles through the most varied and beautiful scenery. We intend to spend another summer there as soon as possible."

To J. L. Shadwell, Esq.

PARSONAGE ROAD, WITHINGTON,
17th October 1872.

"More than six months ago you did me the favour to send me some critical remarks upon my *Theory of Political Economy*. I was then, as I informed you at the time, prevented from giving any attention to the subject by the advice of my physician, and after being absent from home nearly the whole of the summer, it is only within the last few weeks that I have ventured to attempt any work again. You will therefore, perhaps, excuse my long delay in answering your letter, which was, nevertheless, of much interest to me.

"You desire to retain Adam Smith's sense of the word value, and to use as a measure of value the length of time which a man will labour in order to obtain any given commodity. Now, you will find that in page 181 I show my view of the matter to be in accordance with the doctrine of labour *measuring* value, so far as it is true. Articles do exchange in quantities proportional to the products of equal quantities of labour. But the subject requires to be much more carefully analysed, for, as I point out in chap. V., labour is excessively valuable in painfulness, and the length of time is not sufficient to measure the amount of labour. It is true that equal quantities of labour are of equal value to the labourer, using the term value to express esteem or amount of pleasure and pain involved, but equal periods of labour do not necessarily represent equal amounts.

"You object again that I have given no measure of happiness, but you will observe that there are many things which we cannot measure except by their effects. For instance, gravity cannot be measured except by the velocity which it produces in a body in a given time. All the other physical forces, such as light, heat, electricity, are incapable of being measured like water or timber, and it is by their effects that we estimate them. So pleasure must be estimated by its effects; and, though I did not go into the point, labour might undoubtedly be used as one of these effects. The average pain which a common labourer undergoes during, say, a quarter of an hour's work after he has been ten hours at work, would measure the utility to him of his last increments of wages—but the pain of this quarter of an hour is greater than that of any of the previous quarters.

"Then, again, the pleasure may be defined by the amount of commodity producing it. Then the ordinary or average good occasioned to a man by an ounce of bread *after* $\frac{3}{4}$ lb. *of bread have already been eaten* might be taken as a unit of pleasure, remembering of course that the pleasure derived from any commodity is not proportional to that commodity. Then, as I have pointed out, pp. 12-14, all commercial statistics form data, which, if rendered more complete, would enable us to assign numerical values to our formulæ. Prices express the relative esteem for commodities, and enable us to compare the pleasure produced by the final increments of the commodities. Had we complete tables of prices compared with quantities consumed, we could determine the numerical laws of variation of utility.

"I believe I was not sufficiently careful to point out the process by which we might (with perfect statistics) turn all the formulæ into numerical expressions, but I only attempted the first step, which was to get the formulæ correctly, and the main point of difference from Adam Smith was the distinguishing of the *degree of utility from the total amount of utility.*

"With regard to the relative variation of value of gold and silver, I was aware of what was stated about the increased production of silver, but I am not aware that this increase is nearly so great as that of the increase of gold. And I

think that it entirely fails to account for the gold price of silver never varying more than about 3 per cent, and generally much less."

On the 13th November he wrote to his brother Herbert:—

"I have felt much better myself during the last week or two, and am becoming quite active again. My election to the council of the college gives me a great deal of occupation without much fatigue, and I am writing very little at present. If all goes on as well as at present, I shall begin to look forward to a long life again, concerning which I was very doubtful during the last nine months."

To John L. Shadwell, Esq.

PARSONAGE ROAD, WITHINGTON,
5th December 1872.

"I have been intending, day after day, to thank you for sending me the copy of the *Westminster Review* containing your article on the 'Theory of Wages.' I particularly remarked the article at the time of its appearance, but not being in good health, set it down for reading at a future time. I have now read it more than once, and carefully considered it, and so far as I can pretend to judge, I think you have put forth the truth very clearly and soundly. I feel sure that the general proposition which you put forth, that wages are ultimately governed by efficiency of labour, will some day or other be recognised as true, and though Mr. Hearn, myself, and perhaps some previous writers, have had some notions to the same effect, yet I think that you have stated the truth more roundly and fully. I am especially pleased with your protest against the effort to procure *cheap labour* as a means of promoting the prosperity of a country. I have often felt inclined to view the matter much in the same light, that cheap labour means a low reward for the main mass of the population, and the good chiefly of landed proprietors, but I do not remember this truth as being anywhere stated so clearly before.

"I think that you are perfectly correct in taking *dear labour* to be the test of prosperity of a people, the dearness being, in fact, the measure of efficiency. It is only in the

details of your argument that I should be inclined to criticise at all. I cannot concur in what you say on p. 202 of over-population resulting only from fluctuations of commerce. Surely there is always over-population when people are improvident, and unable, or careless, to provide for the inevitable vicissitudes of the seasons. Ireland has furnished the clearest possible case of over-population, and I think that the same may be said of the whole agricultural population of the United Kingdom, which has only been to a certain extent saved by the extension of manufactures, as I tried to show in the chapters on population in my *Coal Question.*

"Again, do you not sometimes ignore the variation in the value of money which on several occasions has produced an apparent rise of wages? I entertain no doubt that such is the case at present, and that it lies at the basis of all these strikes.

"A more important point which I should dissent from is your adoption of a general average of wages and a treatment of the higher rates of pay to skilled mechanics and others as exceptional cases. In my *Theory* I have attempted to show that any general rate is illusory, and that every one who works for pay will ultimately be paid according to what he contributes to the general industry. I think that it is the very essence of wages to vary with the skill and efficiency of the labourer, and you will readily see that this follows from your own theory. It is a convenient simplification of the subject to pass over this question of the difference of wages; but you so far detract from the consistency and value of your theory.

"May I express a wish that you will not rest contented with having printed so concise an essay on the subject, but will develop your views more fully? I think there is great need in political economy of keeping independence of thought alive.

"For myself, I am able to do so little work at present, and have such hard tasks of a different sort on hand, that I have little hope of writing anything more on political economy for some time to come."

Being relieved from all his evening work at college, Mr. Jevons found himself able to take the day classes through

the session, but he could do very little other work. The Christmas holidays he spent at Ludlow.

To E. J. Broadfield, Esq.

5 MILL STREET, LUDLOW,
25th December 1872.

"You will be glad to hear that not only the organ gallery but the whole church here, is continually warmed by hot water, so that the temperature is very agreeable. The organ is, I believe, one of the sweetest and best for its size in England, having been built a century or more ago by the German maker Schnetzler (or some such name), and recently reconstructed and improved by Gray and Davison. The tone of the whole is very good, I think, and some of the stops are exquisite in quality. The church also, which is very large and in many respects a beautiful one, seems very favourable for sound, as there is not the least reverberation apparent in any part.

". . . We have quiet comfortable lodgings here; and there are beautiful walks about the castle and river, and the Whitcliff on the other side and close at hand. The quaint little town always amuses us, so that we are doing very well.

"I am now getting on pretty quickly with the large logic, *The Principles of Science;* one hundred and twenty-eight pages are in type, and before next midsummer I hope that the first volume will be completely printed.

"The organ here has thirty-nine sounding stops, four manuals, and strong pedal organ.

"*P.S.*—I am much disappointed in the termination of *Middlemarch.* The introduction of Ladislaw is a blemish on the whole, and the novel would have been better with about half the characters."

On the 1st January 1873 he wrote to his wife, who had gone on from Ludlow to Bridgewater to visit her sister for a couple of days.

"I have just been much pleased to hear of your safe arrival at Bridgewater after a comfortable journey. . . .

"I have just returned from one and three-quarter hour's practice, which, with a walk up to Gravel Hill, will be exercise enough for to-day. You may make your mind quite easy

about me, as now you are once at Enmore Road I shall get on quite well. . . .

"I am in pretty good spirits about the *Logic* just at present. I think I can finish the first volume before the end of this month; and if my health improves as it has lately done, I should think the second volume might be done before the end of the year—but we must not be too sanguine.

"Tell Mary Ann, with my love, that I hope to send her exercises in a few days. I should also like to know whether in reading the *Logic* [*Elementary Lessons*] she detected any errors or defects, as I am thinking of having some corrections made in the plates before long.

"Please remember me kindly to Eliza, and tell her what a beautiful organ we have here. I had Dick to blow the solo organ this afternoon, and produced some startling effects with the flute and trumpets."

To W. H. Brewer, Esq.

PARSONAGE ROAD, WITHINGTON,
15th January 1873.

"I am very much obliged to you for the letter which I received at the college a day or two ago. I was very desirous of learning what attempts had been made to apply mathematics to political economy, and I carefully searched the British Museum catalogues, the Royal Society catalogues of papers, and some bibliographical books without success. Whenever the occasion shall arise, I shall hope to make proper use of the information which you have so kindly procured for me. Since the *Theory of Economy* was published I discovered that I had by some unaccountable oversight omitted to notice Garnier's mention of Cournot's work, *Recherches sur les Principes Mathematiques de la Théorie des Richesses*, par Augustus Cournot; Paris, 1838. I have lately procured this book without difficulty through Messrs. Ascher and Company, but have not yet read it sufficiently to form a definite opinion on its value.

"It evidently has little or no relation to my mode of approaching the subject through a theory of utility. The almost total oblivion into which such works have fallen is

very remarkable, and not encouraging to those who attempt other works of the sort.

"I shall be glad to have any other information which you obtain about the books named; I think something ought to be done to rescue them from entire oblivion.

"It was a pleasure to the examiners to have a candidate to whom they could so unhesitatingly award the medal as to yourself."

To his sister Lucy.

WITHINGTON, 2*d February* 1873.

". . . I am sorry to say that my over-exertions at the Ludlow organ threw me back for six or eight weeks, and I am hardly as well yet as when I went to Ludlow. As it will not do to be going on in this slow manner, we have made up our minds to buy a pony and carriage, so that I can take good long drives several days a week, and get plenty of air without over-exertion. I think that this will give me the best possible chance of recovery; and in spite of the considerable cost, will prove economical in the end. We had our house on fire on Friday evening. The skirting-board close to the chimney-piece in the drawing-room was blazing away at a white heat; and had it not been immediately discovered by Harriet, who was in the room, would probably have been all in flames in half an hour, as the east wind caused a great draught. If it had occurred at night the house might have been burnt, and we sleeping in the room above. The fire must have been caused by burning soot blown down behind the skirting-board by the east wind."

To W. H. Brewer, Esq.

PARSONAGE ROAD, WITHINGTON,
14*th February* 1873.

"Best thanks for your letter, enclosing the extracts from Kröncke's economical investigations; I shall carefully preserve them for future use. I procured Cournot's other work upon economy which you now mention, but have not read more than a few pages. The fact is that what time my health at present allows me to give to work is nearly absorbed by a logical work in slow progress through the

press, so that I have to keep economical matters for the future.

"I have, however, since your previous letter, looked a little more into Cournot's *Recherches*, and am inclined to regard it as a very able and mostly sound work, though it hardly gets anywhere to the bottom of the matter. The latter part of the book, in which he treats of the law of supply and demand, is very striking and original.

"My *Theory* has been reviewed in the *Academy* of 1st April 1872, p. 131; the *Manchester Guardian* of 22d November 1871; the *Manchester Examiner* of 15th November 1871; the *Glasgow Daily Herald* of 16th December 1871; the *Evening Standard* of 17th December 1871, in addition to those you mention, and a few other brief notices.

"You may be interested to hear of a paper by Mr. Fleeming Jenkin in the *Proceedings of the Edinburgh Royal Society* (1871-72), p. 618, in which the method of his paper in 'Recess Studies' is farther pursued. Some reference is made to my *Theory;* but as regards questions of priority, Mr. Jenkin has allowed himself to be in error.

"I shall look forward with interest to any further results of your researches."

To his sister Lucy.

THE PEACOCK INN,
BASLOW, 30*th March* 1873.

"We are having a quiet Sunday in this beautiful little hotel. The weather being so favourable, and both of us rather in need of a change, we made the first of our intended drives in our pony carriage; and the pony brought us all the way from Manchester very pluckily. As the distance is nearly thirty-five miles, and there are two long hills on the way, it is naturally somewhat tired to-day; but after a quiet day I hope it will be ready to take us back to-morrow. Many parts of the drive were very beautiful, especially between Buxton and here.

"I do not know whether you remember the Peacock Inn, which stands on a slight elevation on the right hand side of the road as you go to the lower part of the village, where we once stopped, possibly in this inn. I do not know any place where they make one more comfortable;

and there is a charming view over the meadows looking towards Chatsworth, where we expect a pleasant walk this afternoon. . . .

We propose to take a driving tour during the Easter holidays, probably in Cheshire or the nearer parts of Wales; but it partly depends on the pony and partly on the weather."

On the 24th April, after the holidays, he wrote again to his sister:—

"Our tour was, on the whole, very successful. We went first to Northwich, seventeen or eighteen miles away, inspected salt works, and descended into a salt mine; then through Delamere Forest to Chester, where we spent Good Friday in the very comfortable Grosvenor Hotel, Fred and Sarah being away from home. On the Saturday we reached Llangollen; and though the Hand Hotel was very full, we found it comfortable. On Sunday we gave the pony a rest; and we climbed Dinas Brân, 700 or 800 feet high, a task I dare not have attempted a few months ago. We were well pleased with Llangollen, Harriet finding it much more pretty than she expected. After visiting Valle Crucis Abbey on Monday morning we went on to Corwen; thence on Tuesday we had a long drive by the Holyhead Road to Capel Curig, where we again gave the pony a day's rest. Siabod and Snowdon looked magnificent on our first approach, owing to a thin haze which magnified their apparent size, but at other times the haze was so thick that we got no good views. We were not altogether pleased with Capel Curig Hotel, nor with their charges; but the situation is delightful. Rain having come on, we made a short stage to Pentre Voelas. The next day being fortunately fine, we crossed the moors to Denbigh; and after visiting the castle, went on to St. Asaph, and spent the night in the smallest of cathedral towns. The next day's work was somewhat arduous, as we drove through Ruddlan and Diserth to Holywell; and after seeing the well reached Mold. On Sunday morning we had a short stage through Hawarden to Chester; and on Monday a long and rather tedious drive of nearly forty miles to Withington. I am glad to say that the pony stood the work very well, in spite of the long steep hills we

occasionally encountered. We had one or two little mishaps with the carriage, which, although not preventing our getting home in it, have necessitated our sending it to be repaired. On the whole, our tour was most enjoyable, the weather being generally very agreeable. Were it not for the expense, which amounted to nearly thirty shillings a day, I should wish to repeat the tour in other parts of England."

To the *Contemporary Review* for May Mr. Jevons contributed an article, "Who discovered the Quantification of the Predicate?" but with that exception his time was still devoted to the completion of the *Principles of Science.*

To his brother Herbert.

PARSONAGE ROAD, WITHINGTON,
25th June 1873.

"We leave for a long tour in Norway the day after to-morrow, and I write a few lines to say that I hope you are now much better in consequence of the bold step you took. Your correspondence has again dropped off, but in the meantime I take no news to be good news.

"I have also taken a bold step, in asking the college to give me a session's leave of absence, offering at the same time my resignation as an alternative. Though there has been no opportunity yet of giving me leave formally, I understand that there is no doubt about it. I have to find a substitute at a cost of £200, but have got a good one for that. You must not suppose that my health is any worse; on the contrary, it is better, but there is so much leeway yet to make up, and so little reason why I should at all endanger my ultimate complete restoration, that I feel sure it is wise to make the sacrifice, and both Harriet and myself will enjoy the tours we intend to make.

"We begin with Norway again, where I intend to do much execution on the salmon and trout, having laid in some fine tackle.

"In September we hope to have Tom and his family here; in the new year we hope, if all goes well, to spend many months in Italy, the Tyrol, Germany, or other parts of the Continent.

"All that I suffer from now is nervous and muscular weakness, which it takes some time to recover from; but having improved during a session of work, I trust there is little doubt of thorough restoration during a session of play.

"I know too little of your present affairs to discuss them as I should like.

"I am much occupied with final arrangements for our departure, and so must say farewell."

To his sister Lucy.

LILLEHAMMER, *2d July* 1873.

"You will perhaps like to have a few lines announcing our safe arrival in Norway. We left Hull on Friday evening last at about eight o'clock, in the steamboat *Oder*, which was considerably smaller than the *Hero*, in which we crossed last summer. Although there was but little wind or sea, she took to rolling, and on Saturday nearly all the ladies and many of the men were sick. I was glad to find myself a better sailor than last year, and more like what I used to be. During Saturday night we had a fresh breeze, and the ship rolled a good deal, but next day the wind and sea calmed down, and as we approached the coast of Norway everything became cheerful and pleasant.

"We reached Christiansand, where we previously stayed some days, at 4 P.M., and after landing a few passengers and a little cargo, proceeded toward Christiania. There was some trouble among the steerage passengers, as a watch had been stolen and a case of hats in the hold broken open. We had a rather curious scene when the trunks of the passengers were searched on their going ashore. One of the hats was found in one trunk, but the watch was not discovered. What happened to the thief on getting ashore we did not learn.

"Next morning, Monday, we were in the entrance of the Christiania Fiord, which runs up into the country for many miles, and we had a calm and pleasant sail up it until nearly one o'clock. We were then troubled by hearing as soon as we were alongside the wharf that all the hotels in Christiania were full, owing to some timber market or fair which was being held. Some of the passengers, it seemed, had telegraphed from Christiansand, but eventually a nice room was

found for us, and all the other passengers, I believe, found accommodation, except one young man, who had to sleep on board the steamboat. It *afterwards* turned out that he had telegraphed for a room, but owing to circumstances into which I did not think it necessary to inquire minutely, we had got his room.

"After changing money, buying a few cheap novels, and completing our stock of provisions and necessaries at Mr. Bennett's, a man who is the factotum of Norwegian tourists, we set off on Tuesday morning by a railway about forty-five miles long, which goes to the foot of Miösen Lake. This is a fine long lake, no less than sixty-five miles long, up which we were conveyed by a good steamboat, crowded with Norwegians. It took the whole day, from 8 A.M. to 7 P.M., to get from Christiania here. Lillehammer is a small, curious town, at the head of Miösen (the lake is really called Miös, and *en* is the article *the*, as we discovered yesterday), and is the starting-point for the roads to the northward. There is nothing in the neighbourhood to detain us, but we are taking a little rest to-day, and shall at the most only go a couple of stages by cariole this afternoon. We propose to go in the course of a day or two to a little mountain inn, at a place called Rödsheim, afterwards we shall proceed leisurely down the Romsdal, stopping a day or two at the stations where trout fishing is to be had. I want to find a quiet place to make my first essays in the angler's art, before entering upon salmon fishing at Hotel Aak.

"Although rather tired by the voyage and the bustle at Christiania, I think I am much more fit for travelling this summer than last, and hope to come home, comparatively speaking, quite strong. . . .

"This morning we have delightfully bright weather, and the scenery around is cheerful and pretty, though not grand, the head of the lake being surrounded by pine-covered hills of moderate height, dotted over with bright green fields and little red farm-houses.

"They are very primitive people here; the bedrooms lead out of each other, and the maids coolly walk about your bedroom early in the morning, carrying off your boots to clean, inquiring what you will have for breakfast, etc."

On the way to Aak Mr. Jevons stopped for a day or two at Lesje Jernvœrk, at the head of the Romsdal, on purpose to examine the lake there, which was said to have two outfalls. After a thorough examination he came to the conclusion that it was a mistake. On his return to England he sent an article on the subject to *Nature*, called "Lakes with two Outfalls."

To his sister Lucy.

MERAAK, GEIRANGER FIORD,
NORWAY, 30*th July* 1873.

"We have now got nearly to the end of the world, but find it a pleasant place, in which we propose to spend two or three quiet days. We came up the Stor Fiord yesterday on a steamboat, reaching Hellesylt early in the evening. As there were rather more tourists than could be easily accommodated, we took the quietest little bedroom which you could imagine, consisting of one of the very small wooden huts which had been neatly fitted up for such use. Here we slept well until 4 A.M., when we were wakened, and had to get on board the steamboat again, as it was going to leave at 5.

"The Geiranger Fiord is a branch of the Stor Fiord, and it took us about two hours to reach Meraak. The scenery on the way was in the highest degree beautiful; in fact I was hardly ever so much pleased with any view. The fiord is bounded by vast rocky ranges, which sometimes rise in cliffs 1000 or 1500 feet almost perpendicularly out of the water. The Nœrö Fiord is a vast gorge of the same dimensions, but it is dark and gloomy, and almost terrible. In this fiord the rocks are beautifully diversified in form, clothed in many places with fine woods, in others with bright patches of green fields, on which, at surprising heights above the water, are perched little sœters or farm-houses, prettily coloured. These cottages can only be reached from the water by climbing from the boat-house at the edge of the fiord up dizzy paths winding among the rocks, where ropes or rails are requisite for safety. It is said, too, that mothers tether their children in these places, to prevent their falling over the precipices, which may be within a few yards of the door. To all the other beauties of the fiord was added that of the waterfalls. The minor fosses, streaming down the

hills through thousands of feet, were almost too numerous to receive individual notice, but that known as the 'Seven Sisters' was so lovely that even the sailors who had passed it numberless times seemed to be none the less struck with its beauty. In times of flood it consists of seven streams, which flow down the face of a prominent cliff, through many hundreds of feet. In some places the water descended through the air in graceful festoons, as in the Staubbach; in others it coursed down the rocks, and leaped in every variety of form, so that there were hundreds of little cataracts in view at once. As we passed, the sun shone out well, and a fragmentary rainbow crossed the spray and mist which floated round. Light clouds hung about the surrounding precipices, showing their magnitude without obscuring their forms. The whole scene was more like what one might expect to see in fairyland than in this commonplace world, and you might probably travel over every part of the globe before you would find anything to surpass it.

"Meraak is a small village at the head of the Geiranger Fiord; and though the beauty here does not equal that in the lower bends of the fiord, it is grand and charming. A small hotel has been lately put up here—the celebrated 'recently in this place rised establishment,' of which the advertisements have been a standing amusement to Norwegian travellers. But even the scenery and the unique English of the advertisement have not brought many people to stay, so that we have the small hotel to ourselves, and the primitive people of the house are very attentive. Just outside the door is the water of the fiord, and the boat from which I intend to fish.

"My letter to Tom was posted while we were at Aak. We there passed ten or eleven days with even more pleasure than on our previous visit. I spent many hours fishing, the favourite mode being to sit in a boat, and be rowed about the river trolling for salmon, and catching perhaps once in two hours a trout of some size. As little or no skill is requisite in this kind of fishing, I was unable to account for my comparative ill luck, as I never got beyond a two pound trout, and never beyond two fish at a time. Nevertheless other men caught large trout, and three or four salmon of

seven or ten pounds' weight were also caught. The visitors at Aak this year seemed more than usually agreeable. Among them were two men who proved to be old college acquaintances of Tom's and mine, the latter being pretty well known to Tom. Our chief friends were three Americans, two brothers and a sister, from Boston, whom it would be difficult not to like, and whom we shall be glad to meet again in some other part of our journey. In spite of the small rooms and somewhat scanty fare, Hotel Aak is a charming place to idle away a few weeks in, and we already talk of a third visit in some future year.

"From Aak we went down the Romsdal Fiord in a steamer and stayed one night at Molde, getting a glorious view across the broad fiord of the long range of snow-patched peaks and fjelds visible therefrom. Crossing the fiord again by steamboat about mid-day on Sunday, we took horses at Vestnaes, whence a road leads to a promontory on the Stor Fiord. During part of the four hours' drive we passed over high moorlands and among bare sloping mountains pleasantly reminding us of Wales; but as we approached Söholt, on the Stor Fiord, the scenery became still more beautiful, and the first view of the long reach of the fiord, surrounded by innumerable headlands and mountains, variegated with snow, was very charming. Söholt is a very pleasing village prettily situated on the grassy slopes around a bay of the fiord; and we passed two quiet nights in the hotel very comfortably, the only drawback being occasional heavy rains. Here I had my most successful fishing as yet. By the aid of a little carriage we climbed up the mountains to a lake, where I got six nice trout, but not of any great size.

"*Udvick, Nord Fiord, 5th August* 1873.—We have now advanced somewhat on our overland journey to Bergen. From the Geiranger Fiord we returned by a four hours' boat journey to Hellesylt on the Stor Fiord, whence by a rather long and tiresome drive we got to Faleidet on the Nord Fiord. The weather is much less favourable to us this year than last, and half the long drive was passed in rain, the clouds throughout hiding the greater mountains. There was, nevertheless, much that was beautiful on the

way; and the first view of the green water of the Nord Fiord, with the grand group of snowy mountains surrounding the head of the fiord, was very charming. At Faleïdet is a pretty and in many respects a nice little hotel, where we stayed four days, partly on account of the rainy weather, partly because the occasional absence of proper meals or of suitable food had made both of us somewhat unwell. . . .

"This morning we have come over the fiord by a boat, a two hours' row, and we shall probably go on to-morrow, although it is requisite to take a twelve or fifteen hours' journey, beginning with a steep ascent up a mountain. We intend to stay at a place called *Saude*, where there is good river and lake trout-fishing, and afterwards we reach Bergen by steamboat.

To W. H. Brewer, Esq.

UDVICK, NORD FIORD,
NORWAY, *5th August* 1873.

"I was glad to receive your letter a few days since, and to hear that the council had, as I expected, appointed you as lecturer for the following session. As I have now an opportunity of posting a letter by the steamboat to-morrow, I will answer your questions as fully as I can.

"1. Your classes will be four in number. (*a*) Logic and mental and moral philosophy three hours per week throughout the session. The logic is taken first, and has usually occupied the course till the end of January, but if you prefer you can terminate it at Christmas. In this part of the course I have always given exercises—at least twice a week. Mental philosophy begins when the logic is concluded, and occupies the time till about the end of April; and the remaining four or five weeks are then given to moral philosophy; occasional essays are required in mental and moral philosophy.

"2. You will not need to give any formal introductory lectures. Certain of the professors will give public introductories at the opening of the new buildings, but we are much opposed to admitting the public to the opening of each class. You can, therefore, start with your subject at once; but as the class is not always complete the first day or two, it is well not to get into any important part of the subject.

"3. All the lecturers hold examinations of their classes at Christmas and I think also at Easter, of which you will be fully informed; but you can also appropriate a lecture hour to a brief examination whenever you think fit. I find I have overlooked the greater part of my answer to (1) and therefore return to it. (*b*) The political economy day-class is held for one hour weekly throughout the session, and you can count the number of lectures in the calendar. In this class occasional essays or written answers to questions may be required at your discretion, but you will not get as full answers as you might desire. I have generally followed somewhat the order of subjects in Mill's *Political Economy*, in perfect independence, however, of his views and methods when desirable. In the subject of currency I have always abandoned his book altogether; although it would of course be desirable to include in your lectures more or less reference to all the parts of the subject, especially those named in the prospectus, yet the relative amount of attention given to the different parts must be left to your own discretion, and it has in my own case varied much from year to year. (*c*) The evening logic class consists of twenty weekly lectures. It may consist of the day lectures condensed and slightly simplified; but you will find a considerable proportion of the students able to enter pretty fully into the subject. Weekly exercises should be given out, though many will not give satisfactory answers. (*d*) Evening political economy. This may consist of the day lectures condensed, and some of the less important parts omitted. A few essays may be expected, and directions for reading may be given. (*e*) Pupil teachers' class. In this class rudimentary instruction in political economy is given. My usual method has been to begin with a *viva voce* cross-examination and discussion on the subject of last week's lecture for about a quarter of an hour or twenty minutes; and then to proceed to the DICTATION of a simple lesson, interspersed with explanations and illustrations. I find that the pupil teachers are mostly too young to take down proper notes of an ordinary lecture, and, therefore, I have dictated the more important parts slowly.

"Having had so much experience in teaching, you will of course be able to choose your own way of instruction, and I only mention my own way for sake of suggestion. Brief essays should be required from the pupil teachers. You will have to select your own style of lecturing. Some of our professors write their lectures complete and read them off; others give them entirely extempore, as in chemistry especially. My own mode is to have full notes, extracts, and written propositions of importance, and to dictate important statements verbatim and slowly, interspersing them with extempore discussions. The lecture is much relieved by occasional questions to the class generally, and I also use the blackboard upon every possible opportunity, especially in logic. You will, I hope, take these suggestions founded on my own practice for what they are worth, and your own experience will probably lead you to the best mode of instruction.

"I shall hope to be at home in England before the middle of September, when I will write again to you; and we may perhaps have the pleasure of seeing you in Manchester shortly after that. We are having very bad weather at present, every day rainy and cold; but still there is enjoyment in the continual succession of splendid scenery through which we are slowly travelling by land and water.

"Thanks for your kind wishes concerning my health. I think Norway is doing me much good on the whole, though the slight hardships we have to put up with are sometimes rather trying to those whose digestion is not very good. Nothing, however, can exceed the perfect idleness and freedom from business or anxiety which we enjoy here: we have not had any news at all since we left England five weeks ago."

To his sister Lucy.

SANDE, *12th August* 1873.

"As it is a very wet morning, and the fish will not rise, I may as well write you a short account of our late proceedings. We are now in a comfortable little inn in a very pretty spot. The rugged and gloomy mountains which usually surround us on the west coast of Norway have here

given place to beautifully wooded ranges of less height, and the valley is open, with a fine river wandering through it. The scenery reminds me very much of Bettws y Coed and the neighbouring parts. As the station is unusually comfortable, and there is trout-fishing in the river a few yards from the house, we are spending a quiet week here. Our companions also are agreeable, consisting at present of only the three Americans. My old college fellows also were here till this morning, and completed a quiet party.

"Since I wrote last from Faleidet and Udvig, we have had much bad weather, but have nevertheless enjoyed three days' travelling through glorious scenery. It is the peculiarity of Norway that there are not simply a few grand views, but an endless succession, and what we are unable to go to is often finer than what we see. From Udvig it was necessary to make a heavy day's journey, beginning at 7 A.M. by the ascent of a mountain 2200 feet high, which was so steep that we had to walk up three-quarters of the way, this being by far the heaviest climb which I have done since my illness. From the top we had a fine sight of great mountains, and a peep of the Justedal Glacier, which is said to be the largest in Europe. Driving down the other side of the mountain, we reached a fine lake, which it was necessary to pass by boat. At its upper end the lake is hemmed in by lofty precipices, but the view was to a great extent obscured by a storm of rain and wind which came on when we were halfway, and rendered our journey three hours instead of two hours long. Harriet was a little frightened by the waves, but there was no danger whatever, and the men in these lakes and fiords always keep close to the shore when they can. From the end of the lake we drove through a glorious pass, bounded by immense precipices, and scattered over at the bottom with huge boulders larger than houses. One very striking feature was a great double-pointed mountain which stood out at the turn of the valley, with a very pretty waterfall coming down some thousand feet, or perhaps two thousand, from between the two points.

"After passing a succession of small lakes, we reached the beginning of the Jölster Vand, along the shore of which we had a somewhat tedious drive of sixteen miles, getting to

a small inn at 8 P.M. in the evening, well tired with the thirteen hours' travelling, a large part of which was performed in heavy rain. The fatigue of driving is often considerable, as we have to sit as well as we can in the most inconvenient little carts, jolting over rocks and stones, jumping out occasionally to walk up steep hills or sometimes down them. The next journey was a much shorter one, and along a very easy road. We afterwards came on here, along two stages of a very beautiful road, a succession of small lakes, pretty wooded hills, green slopes covered with cottages and barns; at a moderate distance also were two splendid mountains, rising precipitously about 4500 feet, and forming the commencement of a series of great mountain masses, which shaded away beautifully towards the coast.

"We have now been here four days, and the regular, plentiful meals, with plenty of exercise between, have done me great good. I can now fish for several hours in the morning and evening without being too tired. My success is not satisfactory, luck being as usual against me, the river much too full of water, and the weather usually unfavourable. The fish, too, are small, not usually exceeding half a pound, though I live in hopes of catching one of the large trout which are in the river.

"17*th August.*—We are still here, and I have enjoyed a good many days' fishing, with tolerable success. We leave to-morrow morning for Vadheim, on the Sogne Fiord, whence a steamboat will take us to Bergen. It is raining harder than ever this morning, and I fear there will be little more fine weather on the west coast this year. Although we carefully made arrangements for receiving letters, they have failed, and we have heard from other tourists of five letters which reached places after we had left. We hope to have them in Bergen.

"The Beebes are still here with us, and go on to Bergen with us. Yesterday they went up the lake, leaving in good time in the morning, and did not get home till one o'clock this morning.

"*Bergen,* 19*th August.*—The steamer was three hours late when it reached Vadheim, and brought us into the harbour here at the inconvenient hour of midnight. To

complete our misfortunes, the hotel was full when we got to it, so that Harriet and I had to lie down and sleep on the sofas in the eating-room until 6 A.M. this morning, when a large American party left, and we went to bed in one of their rooms. We have been glad to get letters here, and I am especially pleased to have Tom's, stating that he has got safely to England, and mentioning his plans. . . .

"Bergen is amusing even on our third visit to it, but the weather is still rainy. We probably leave here the day after to-morrow, and cross the Fille Fjeld to Christiania. . . ."

On the 8th September he wrote to his sister to tell her that they had reached home, and on the 18th he wrote again to her from Chester:—

"I ought to have again written to you without so much delay, but I have been rather busy. We are now engaged in driving our pony and carriage home from Oxton, where Will has been taking care of it for us. I have taken advantage of the opportunity to drive Harriet round Wirral in order to show her West Kirby, Heswell, Parkgate, and the other places which were so familiar to us in our youth. We stayed one night at Hoylake, a second at Chester, and expect to reach home this evening, by way of Delamere and Northwich. We are looking forward with pleasure to our visit to Ludlow. . . ."

Except for a brief visit to Ludlow, Mr. Jevons remained at home for the rest of the year, being occupied in concluding his *Principles of Science*.

Though he did not lecture this session, he was present at the opening of the new Owens College Buildings, which took place at the beginning of October. In commemoration of the event the professors and lecturers published a volume of *Essays and Addresses* on various subjects. Mr. Jevons contributed an essay on "Railways and the State," in which he pointed out the fallacies in the argument that because the Government managed the Post Office well, they would be able to manage the railways well, and expressed his opinion that the purchase of the railways by the State was a quite impracticable scheme.

To his sister Lucy.

PARSONAGE ROAD, WITHINGTON,
17th December 1873.

"I think that I have never written to you since we left Ludlow. It was a pleasant time we had there in spite of my being occasionally knocked up. . . . I am sure that I feel noises far less than I used to do when my nerves were all unstrung without my knowing it. My landlord is building two new houses within a few yards of my study windows, but the noise has not been the least hindrance to me, and I almost think I could stand barrel organs now.

"I hope to finish the book before Christmas day. There are only a few proofs now remaining to be corrected. It is hardly likely that the book can be bound and finished before some time in February. I wish I could have sent it for a Christmas present, but I will try to have one sent when it is ready.

To his sister Lucy.

PARSONAGE ROAD, WITHINGTON,
19th December 1873.

". . . Thanks for your good wishes on our wedding-day. As every year goes on I congratulate myself on having got so good a wife, and my only fear in life, as I may almost say, is of becoming too dependent on her.

"I will remember about my father's grave, and will try to get it photographed, but it is not always easy to manage in England, and with my entire want of knowledge of the language there may be some difficulty. Harriet, however, is learning up her Italian, and may, perhaps, manage it. . . ."

On the 25th December he wrote to his sister:—

"I have just finished the last proof of the *Principles*, so that I think I shall have agreeable recollections connected with this Christmas day. . . ."

CHAPTER X.

1874–1876.

THE *Principles of Science*, a treatise on logic and scientific method, was published at the beginning of February 1874. In this book, which had occupied years of thought and labour, Mr. Jevons had fully developed his logical system, of which he had given a preliminary account in the *Substitution of Similars*. The design of the book was to detect the general methods of inductive investigation, and to show that the "more elaborate and interesting processes of quantitative induction have their necessary foundation in the simpler science of formal logic." The frontispiece was an engraving of his logical machine, which, as well as his logical abecedarium, he fully described in the course of the work. In the preface to the first edition Mr. Jevons says, "The study both of formal logic, and of the theory of probabilities, has led me to adopt the opinion that there is no such thing as a distinct method of induction as contrasted with deduction, but that induction is simply an inverse employment of deduction. . . . I endeavour to show that hypothetical anticipation of nature is an essential part of inductive inquiry, and that it is the Newtonian method of deductive reasoning, combined with elaborate experimental verification, which has led to all the great triumphs of deductive research." In the chapters on "The use of Hypothesis," on "Empirical Knowledge, Explanation and Prediction," on "Accordance of Quantitative Theories and Experiments," and on "The Character of an Experimentalist," he illustrated what he said so fully, with examples drawn from various physical sciences, as to cause consider-

able surprise to those who were unaware how much he had studied physical science in his youth. The concluding chapter of the work consists of "Reflections on the Results and Limits of Scientific Method," and in the preface to the first edition he thus refers to it:—

"In certain concluding remarks I have expressed the conviction, which the study of logic has by degrees forced upon my mind, that serious misconceptions are entertained by some scientific men as to the logical value of our knowledge of nature. We have heard much of what has been aptly called the Reign of Law, and the necessity and uniformity of natural forces has been not uncommonly interpreted as involving the non-existence of an intelligent and benevolent power, capable of interfering with the course of natural events. Fears have been expressed that the progress of scientific method must therefore result in dissipating the fondest beliefs of the human heart. Even the 'Utility of Religion' is seriously proposed as a subject of discussion. It seemed to be not out of place in a work on scientific method to allude to the ultimate results and limits of that method. I fear that I have very imperfectly succeeded in impressing my strong conviction that before a vigorous logical scrutiny the reign of law will prove to be an unverified hypothesis, the uniformity of nature an ambiguous expression, the certainty of our scientific inferences to a great extent a delusion. The value of science is of course very high, while the conclusions are kept well within the limits of the data on which they are founded, but it is pointed out that our experience is of the most limited character compared with what there is to learn, while our mental powers seem to fall infinitely short of the task of comprehending and explaining fully the nature of any one object. I draw the conclusion that we must interpret the results of scientific method in an affirmative sense only. Ours must be a truly positive philosophy, not that false negative philosophy which, building on a few material facts, presumes to assert that it has compassed the bounds of existence, while it nevertheless ignores the most unquestionable phenomena of the human mind and feelings."

To his sister Lucy.

ARLES, *28th January* 1874.

"You may perhaps have been surprised not to hear from me sooner, but when travelling I become lazy as regards everything else. You may also perhaps be surprised to find that we are yet some days' journey from Italy at our rate of progress.

"Since we left London we have slept at Dover, Calais, Paris, Lyons, Avignon, Nismes, and now are staying a night here in a large old-fashioned room, with a wood fire. The Mistral, or north wind, from which they suffer here, is blowing terribly hard—a cold dry wind with clouds of dust and a clear sky; but I think it agrees with me, as I have become remarkably strong, after being quite knocked up by a single day in London. We took our journey very easily at first, and stayed five days in Paris, at a comfortable hotel of no great size in the Rue St. Honoré, called the Grand Hôtel de Normandie, which was almost exclusively English.

"I showed Harriet a few things in Paris, such as Père la Chaise, the museum of the Hôtel de Cluny, the Pantheon, Sainte Chapelle, etc. It is sad to see the buildings burnt down, especially the Tuileries, the interior of which we fortunately saw when last in Paris. Nearly all the buildings, however, are being gradually rebuilt, and even the Column in the Place Vendôme is rising again just as before.

"During the last few days we have been greatly pleased with our visits to the ancient towns of Avignon, Nismes, and to-day of Arles. I do not know whether you stayed at any of them on your way to Italy, but they are well worth seeing, both for the Roman antiquities and the mediæval air which still remains about the first and third. I was greatly pleased by seeing the perfect walls of Avignon, and the vast Palace of the Popes is a terrible building, with the dungeons of the Inquisition, where 2100 persons were put to death during the French Revolution of 1791. While at Avignon we drove a short distance out of the town to see the tomb and house of J. S. Mill. We found the tomb a very plain marble structure, an oblong raised slab bearing the celebrated epitaph on his wife. His own epitaph, we were told, was to be shortly

cut on the side. The tomb lies in a quiet nook of the cemetery, in an angle formed by some hedges of cypress, and it is surrounded by a railing enclosing a small garden, with a little walk, both of which bore signs of much care. There were flowers in bloom, and glasses to cover them, and a basket and trowel for gardening. It seems that Miss Taylor is now living at Avignon, and visits the tomb every day, and no doubt does the requisite gardening. The house was not half a mile off, in the flat and least wholesome and interesting part of the country near Avignon. It was a very plain little country house, a hundred yards off the road, with which it was connected by a strip of garden, with lopped trees. There was nothing attractive about it. The large old-fashioned hotel (Hôtel de l'Europe) at which we stayed two nights in Avignon was the one where Mrs. Mill died, and it seems that he carried away the furniture of the small room in which she died, and afterwards constantly frequented the house, coming there to chat with the landlady, Madame Pierrow. I daresay these details about Mill will interest you, though I cannot myself approve of such a morbid attachment to the dead.

"At Nismes we were much pleased with the grand Roman amphitheatre, nearly complete, and the Roman temple, which is quite so. To-day we have had again a great treat, in a series of antiquities, ranging downwards from the times of the emperors, including an amphitheatre even greater than that of Nismes, the remains of a Roman theatre, a cathedral one thousand years old, cloisters, of which the four sides have been built at four different ages, from the ninth to the sixteenth century, all sides being remarkable for the curious carvings or the beauty of their architecture. The most unique thing in the town, however, is the ancient cemetery, commenced by the Romans, and carried on by the Christians, from which thousands of stone coffins have been dug out, many of them richly carved, and full of various antiquities.

"We propose to go on to-morrow to Cannes or Nice, and to make our way without much farther delay to Florence and Rome. . . .

"Gladstone's recent move has somewhat astonished us,

and I cannot approve of the immense proposed reduction of taxation. Both this and the sudden dissolution seem to me an extreme measure for securing Liberal support, and I shall not be surprised if he succeeds.

"I am now going down to examine some Roman catacombs said to exist under the hotel. By the bye, there are two columns and a corner of a Roman temple built into the front wall of our room.

"The catacombs were worth seeing, consisting of extensive arched vaults of undoubted Roman work, with a good supply of bones."

To his sister Lucy.

GENOA, *5th February* 1874.

"I received your letter at the post office here yesterday afternoon, and feel that the news about Herbert has quite cast a gloom over things. I was so pleased the month before with his cheerful letter and agreeable prospects; but now I fear there is something seriously wrong with him, though it may be any one of a hundred things, and it is useless trying to guess what it is. . . .

"Until this sad letter about Herbert came, our travels were proceeding most pleasantly. We spent three or four days most agreeably at Mentone, which is a charming place, and the weather was perfect. You will perhaps be surprised to hear that I visited the gambling house at Monaco, and tried my hand on a very small scale, winning about a pound. It makes one realise what an evil such a place is, and one cannot but regret the more that it is situated in one of the most lovely spots on earth, more beautiful even than Mentone. We have been one day in Genoa, and have seen a good deal of it; there is much that has interested me greatly, and the view of the place from the harbour is superb; but the architecture of the palaces and *most* of the churches, so far as I have seen them, is most disappointing. We shall see a little more of Genoa this afternoon, and then leave for Alessandria on the way to Florence. Our only address now will be care of Miss Smith, 93 Piazza di Spagna, Rome.

"The Hôtel de Genes, in which we are, is a very good one, made out of an old palace, with fine marble staircases.

Our bedroom is a great lofty chamber with painted and vaulted roofs, and yet the charges seem moderate. At Mentone we were in a quiet but most agreeable hotel, called the Hôtel des Iles Britanniques. At Nice we were less fortunate, and only stayed one night, and possibly this has caused us to have an unfavourable opinion of the town compared with Mentone."

To his sister Lucy.

93 PIAZZA DI SPAGNA,
ROME, 20*th February* 1874.

"At last we are in Rome, having arrived here last night by the only train from Leghorn. . . .

"We spent one whole day and two nights in Leghorn, and of course visited the cemetery, which I found close to the railway station. After a few minutes' search I discovered my father's grave, and was glad to observe that it was in perfect preservation. The railing of which you spoke has, indeed, never been added, but I like the plain marble slab and the simple inscription. At the foot was a flourishing little shrub of laurustinus and at the head a rose tree, which was vigorous but rather straggling. I pruned it down a little into better shape, and I brought away a bud from the rose and a flower from the laurustinus, which Harriet thought you might like to have. . . . I felt glad to have seen my father's grave, and found it in perfectly good condition. The cemetery is a pleasant little one, and is well enclosed and kept. The rose and laurustinus will both live a long time, especially the former, and the latter hardly looked like an old shrub.

"We have got a capital room here, and we shall probably like Miss Smith's *pension* very well, though they were having some sort of horrid reception evening when we turned up cold and tired from our long railway journey. Harriet is a little overdone to-day, but I do not think it is more than a little fatigue. I am also not very lively, and our first day in Rome has not been enthusiastic. This morning we went down to the Forum, the Coliseum, and other parts of old Rome, for an hour or two, but this afternoon have done nothing.

"We had a very agreeable visit of three or four days to Florence, where we saw a great deal in the time; and finished up on Sunday by walking about five or six hours, including a beautiful walk out of town to Galileo's Tower and the Hill of San Miniato, from both of which places the views were lovely. This walk, however, knocked us both up for the first time in this tour.

"We were one day at Pisa, staying one night at the Grand Hotel Peverada facing the river, close to the principal bridge. I think it must have been either the one at which my father died or next to it. With the cathedral and surrounding building I was, as you may imagine, very much pleased. I ought to say that since I last wrote we had to change our tour to agree with circular tickets with much reduced prices which I had bought, and which obliged us to go from Genoa by Turin and Milan to Venice.

"We stayed at Venice three or four days at a very comfortable hotel near the Piazza, and looking over the end of the Grand Canal. We found ourselves there in the company of two princes, three princesses, and quite a number of counts and countesses; and I was much relieved at the end of the time to find the bill distinctly moderate, though one of the waiters informed me that a countess had expressed herself in strong terms of a contrary opinion. I was much pleased with Venice naturally, though sorry to come to the conclusion that it is doomed to sink into ruins by degrees. One-fourth of the inhabitants are paupers, and it is difficult to tell what the remainder live upon except for visitors. I had a pleasant look into some of the manuscripts of the fine old library of St. Mark's; I also visited the National Library of Florence, and am going to try to get into the Vatican Library here. . . .

"You will perhaps have seen by advertisements that the *Principles of Science* is published. I hear from Macmillan that the first sales were 170 in England, which with the American sale might make 200. This is not much towards selling an edition of 1250, and I am not sanguine about the success of the book in a pecuniary sense. I have requested Macmillan to send you a copy, and you ought to have received it before you get this.

"21*st February*. . . We have both of us been remarkably well and active, and the cold frosty weather we have hitherto had in Italy has suited me well, though it was rather too cold to be agreeable, and in Venice almost prevented us from indulging in gondolas. . . ."

To E. J. Broadfield, Esq.

PENSION, MISS SMITH,
93 PIAZZA DI SPAGNA,
ROME, 22*d February* 1874.

". . . We have had so far a glorious journey, and have visited a number of towns. We stayed successively at Paris, Lyons, Avignon, Nismes, Arles, Nice, Mentone, Genoa, Milan, Verona, Venice, Florence, Pisa, and Leghorn; and we have now the prospect of several weeks to spend in Rome and Naples before returning to Florence and Milan on our way homewards. Possibly we may also visit the Italian lakes. We were much pleased with the old French towns, and at Avignon we made a pilgrimage to the tomb and house of Mill.

"*Rome*, 3*d March*.—Excuse the long interval between the first and last parts of this letter. I am never inclined for writing whilst travelling, and since being here have been knocked up by too much exertion in sight-seeing. We are having, nevertheless, a very enjoyable time of it. The ancient sculpture pleases me exceedingly, and strikes me as the perfection of art. Both the Capitoline and the Vatican Museums are delightful; I cannot say the same of the frescoes and pictures. Having now seen what are considered to be the finest pictures in the world, I venture to come to the opinion, in which I suppose I am nearly alone, that the mediæval art was for the most part a delusion. I always supposed that Michael Angelo was a wonderful man; but having seen both his frescoes and his architecture I give him up. His sculpture is rather better, but does not for a moment compare with the antique sculpture. As to other artists, their interminable succession of Madonnas and martyrs undergoing all sorts of operations are wearisome when they are not revolting. My own opinion is that a great deal which is now thought so wonderfully beautiful will one or

two centuries hence be classed with the architecture of the seventeenth and eighteenth centuries as absurd and degraded; but it is hardly likely that we shall live to see the end of the delusion. No doubt you will say that overmuch study of logic has blunted my sense of the beautiful, but I hope I have some perception of the beautiful in music; and with the ancient Greek and Roman art I am charmed.

"In architecture also I am often disappointed in Italy. While some of the earlier buildings, like the Campanile at Florence, are the most beautiful things I have ever seen, others are disgusting. The façade of St. Peter's, for instance, is to my mind a wretched production, and the whole building has little beyond size to recommend it. Some of the earlier churches are very beautiful; and I was much pleased with the ancient church of San Zeno at Verona. As regards Roman antiquities, we have already seen many of the principal, but more of course remain. They are now excavating the arena of the Coliseum, and are discovering brick and stone work under the whole of it—curious elliptical walls and passages in various directions. The antiquarians are already inventing explanations of them, but it must be a matter of some difficulty.

"We have of course been much surprised and disgusted with the course of politics in England. I do not wonder that Gladstone proposes to take up philology as his future occupation; but I do not think the English people will long tolerate the reign of Disraeli and the publicans. No doubt the Nonconformists and teetotallers have done their best to bring about the present state of things, and they will reap the natural result of their obstinacy. What I least like in the whole business is Gladstone's offer to make an enormous remission of taxation, which I am sure is against his own better judgment, and contrary to opinions he expressed some years ago in one or two private letters to myself."

To his sister Lucy.

93 PIAZZA DI SPAGNA, ROME,
3d March 1874.

". . . We are having, on the whole, a very pleasant time in Rome, though I have been much knocked up and unable

to see half as much as I should like; but I am now coming round again. We have seen most of the important antiquities already, and some of the galleries. The sculpture galleries of the Vatican and Capitol are delightful places, and we are going again to the former this afternoon. The frescoes and pictures I do not generally care for, and often let Harriet go to them alone. I think there is a great deal of false art in them, and much that is wearisome and disgusting, but the sculpture is all variety, and generally most beautiful, and it is the only sculpture I ever cared for.

"It would be impossible to tell you about a quarter of what we have seen. We have only as yet been two drives outside the walls, once to the Basilica and catacombs of St. Agnese, which were very interesting, and once to some curious Roman tombs. There is now a sharp cold wind blowing, which renders much driving undesirable."

Mr. Jevons visited the Vatican library with great pleasure, but as he continued to feel unwell, he shortened his stay in Rome, and the proposed excursion to Naples was given up. On the way north they stopped a day or two at Perugia, where he went to the public library and examined the old logical MSS. with much interest; and at Milan he spent all his available time in the Ambrosian library. At Bologna he saw Raphael's celebrated picture of St. Cecilia, of which he expressed an unqualified admiration both in subject and execution. It is to be regretted that there is no letter giving an account of his visit to Ravenna, which made an indelible impression upon his mind. Years afterwards he wrote in his article on the "Use and Abuse of Museums," "Who that sees some of the reproductions of the mosaics of Ravenna hanging high up on the walls of the Museum at South Kensington, can acquire therefrom the faintest idea of the mysterious power of those long lines of figures in the Church of St. Apollinaris?" After a brief but delightful visit to the Italian lakes they went by way of the Mont Cenis tunnel to Paris.

To his brother Tom.

WITHINGTON, MANCHESTER,
19th April 1874.

"Although I have a great many other letters requiring

answers, I must defer them until I have written at least a short letter, although it is but to tell you what you must know, that I have been grievously distressed about poor Herbert's death. The fears I had entertained about the nature of his illness had been somewhat removed by his later letters, so that I was quite expecting to see him in England within a few weeks from this time, and I was planning how we could best arrange for his comfort and restoration. The letter therefore which I received in Paris from John was quite a shock, and joined to a rather disquieting report of Lucy's health led us to travel to Ludlow with much speed. . . .

"Of poor Herbert's end I have tried to take the most cheerful view, that it was probably not a *very* painful one, and that the sudden termination undoubtedly relieved him from much suffering. Judging from his letters, I cannot suppose that he had felt any very acute pain, which must have earlier convinced him of the hopeless nature of his illness.

". . . I have been reading over with painful interest the letters which I had from him for years back, which are not many. I am inclined to find some comfort in the belief that the later years of his life, in spite of disappointments and misfortunes, were his happiest. . . . I do not think that he was ever really solitary and purely unhappy. I feel sure he was the most sociable of us all, possibly excepting Lucy, and his days were occupied between bank work during the morning and afternoon, and music, theatres, games of whist, billiards, etc., or occasional dances in the evening. No doubt, as he said in one letter, his life was a dull routine, but so it is for a great many people, and I have little doubt that the free and easy society which arises in new colonial towns may have suited him better than the slow heavy society of English towns.

"There is probably sufficient difference of age between us to prevent you from having as long a recollection of him as myself. My recollections, indeed, are not very vivid, in especial before 1850, when I lodged with him in London. Ever since that time I have felt constant sorrow for his state of health, and more or less anxiety as to what might come of it. . . . But there is one most pleasant feature in his

recent letters. They all show with what courage and strength of mind he was bearing disappointments and misfortunes of various kinds, and at last encountering the certainty of a painful death. All his fickleness of mind seemed to have gone, and he stuck to his post until it was too late to see us again, though we may hope that he had no idea how suddenly his end would come. . . ."

To George H. Darwin, Esq.

PARSONAGE ROAD, WITHINGTON,
MANCHESTER, 22*d April* 1874.

"For more than three months past I have been travelling on the Continent. Your letter of 12th February was forwarded to me, and I was very glad to find that you now allow the correctness, in a certain point of view, of my mode of representing the rate of interest. You will remember that I never denied the correctness of your own formula, which arises from the supposition of different conditions. The question really is, therefore, which conditions most accurately correspond to those of actual industry, and though I have still a prejudice in favour of my own, and like very much the simplicity of the result, I do not propose at present to attempt to decide the question, but shall preserve your solution for the time, if ever, when I approach the subject anew.

"Let me also now thank you for the copy of your paper in the *Contemporary Review* on Mill's views of capital. I read it, when received, with great interest, and agreed with it cordially. I hope we may see many contributions to the theory of economy from you, for I think I could count on the fingers of one hand those in England who really give any contributions of the sort.

"When I reached home a few days ago I was sorry to find that your circular concerning the marriages of cousins had been lying here quite unnoticed. I need hardly say that if I had been at home it would have been promptly returned. I now send it in the hope that it is not altogether too late. Although I am sufficiently acquainted with the genealogical details of a very great number of relatives, either of my own or my wife's, I cannot find that there has been more than one marriage of cousins, that included in the

accompanying return from my wife. There has *been no marriage at all of two persons with similar surnames, so far as I can ascertain.* At first sight I did not perceive the purpose of the return and the method of inquiry, but I presume you intend to count up in newspapers, or other lists of marriages, the comparative number of marriages of similar names to whole number of marriages, and thus by a double ratio to obtain proportional frequency of cousins' marriages. It seems a happy device."

To Professor Léon Walras, Lausanne.

MANCHESTER, *12th May* 1874.

"Pray accept my best thanks for your kindness in sending me a copy of your Memoir, and for the very courteous letter in which you draw my attention to it. When your letter came I had, indeed, already noticed in the *Journal des Economistes* your very remarkable theory. I felt the greater interest in the subject because my own speculations have led me in the same direction, now for the last twelve years or more. It is satisfactory to me to find that my theory of exchange, which, when published in England, was either neglected or criticised, is practically confirmed by your researches. I do not know whether you are acquainted with my writings on the subject. All the chief points of my mathematical theory were clear to my own mind by the year 1862, when I drew up a brief account of it, which was read at the meeting of the British Association at Cambridge, as you will learn from the report of the meeting ('Reports of Sections,' p. 158). A very brief abstract was then alone inserted in the report, but the original paper was printed in the journal of the London Statistical Society in 1866, vol. xxix. p. 282. I beg to forward you, by book post, a copy of this paper. Finally, in 1871, I caused to be published by Messrs. Macmillan and Company an octavo volume called the *Theory of Political Economy*, in which is given a full explanation of the theory, with the aid of mathematical symbols. I shall be glad to learn whether you are yet acquainted with this work, since, if you are not, I shall be happy to present you with a copy. You will find, I think, that your theory substantially coincides with and confirms

mine, although the symbols are differently chosen, and there are incidental variations. You will see that the whole theory rests on the notion (section 8 of your paper) that the *utility* of a commodity is not proportional to its quantity; what you call the *rarity* of a commodity appears to be exactly what I called the *coefficient of utility* at first, and afterwards the *degree of utility*, which, as I also explained, was really the *differential coefficient* of the utility considered as the function of the quantity of commodity. The *theory of exchange* is given in section 14 of my paper, and may be considered to be contained in one sentence. An equation may thus be established on either side between the utility gained and sacrificed at the ratio of exchange of the whole commodities, upon the last increments exchanged.

"Now, in my book of 1871, I show fully how this theory may be expressed in symbols. If there be two persons, A and B, of whom A holds the quantity a of one commodity, and B holds b of another, then I give the equation of exchange in the form

$$\frac{y_1(a-x)}{\psi_1 y} = \frac{y}{x} = \frac{y_2 x}{\psi_2(b-y)},$$

in which x is the unknown quantity which A gives to B in exchange for y. It follows that $\frac{y}{x}$ is equivalent to your p_a or p_b, namely, the price current or ratio of exchange. Again, $y_1(a-x)$ means the *degree of utility*, of so much as he has handed over to B. Now these degrees of utility are exactly equivalent to your *rarities*, and your equation $p_a = \frac{z_a, 1}{z_b, 1}$ is identically the same in meaning with my own form of statement. Indeed, when the meaning of the terms is explained, your proposition 'Les prix courants ou prix d'equilibre sont égaux aux rapports des raretés' is seen to coincide precisely with my theory, except that you do not point out how many equations are requisite, or how many unknown quantities there are.

"The publication of your paper as it now stands is very satisfactory, in so far as it tends to confirm my belief in the correctness of the theory, but it might lead to misapprehensions as to the originality and priority of its publication. I

shall therefore take it as a favour if you will kindly inform me whether you are sufficiently acquainted with my writings, or whether you would desire me to forward a copy of my *Theory of Political Economy*.

"With many thanks for your kindness in bringing the Memoir to my notice, and with much admiration for the clear manner in which you have treated the subject, believe me," etc.

To his brother Tom.

PARSONAGE ROAD, WITHINGTON,
MANCHESTER, 14*th May* 1874.

"I agree with you that it is not well to think much of the past, which is for us in many ways so melancholy. We have enough to think about and do in the present. You will, however, wish to hear the details of poor Herbert's death, which I have now received in a letter from Dr. Coughtrey, of which I enclose a copy. It is quite evident that he died almost instantaneously. . . .

"Thanks for the copy of the *New York Tribune*. I have received two other copies of the same from other people. I have also the *Times* and *Post*. I like the *Tribune* notice very well, and that in the *Times* is not bad. The reviews here are very slow in speaking, if they mean to speak at all. Having sent a copy to Gladstone, I have had a very pleasant and interesting letter on the theological part.

". . . I have been rather troubled about my professorship and monetary arrangements, but shall probably continue, on condition of having no evening lectures this next session. I very nearly resigned. I am at present commencing in a very leisurely way my book for the International Scientific Series, upon the subject, *Money, and the Mechanism of Exchange*. As I look forward to an American demand, I must show some knowledge of the American markets and currency. There was a book I once presented to you, or lent, upon the New York Money Market. Can you post it back to me, or at all events give me the title, since it is essential to me, containing an account of the New York Clearing House? I am ordering Sumner's *History of the American Currency*, but if you can come across any other books relating to American money and banking, I should

much like to have them or the titles. I should also be glad if you would explain to me the exact position of the American currency at the present moment, and the relation between the greenbacks and the National Bank currency. Of course I have noticed and rejoiced over the veto of the Inflation Bill, which has saved America from a gigantic job and blunder."

To Professor Léon Walras.

OWENS COLLEGE,
MANCHESTER, 30*th May* 1874.

"I have now been in possession, for two or three days, of part of the proofs of your work on the *Theorie de la Richesse Sociale*, which you have been so good as to send me, and I have already read a considerable portion of them with much admiration. Before attempting to form any final opinion as to whether there are important points of difference between our views or not, I should like to have more time to study and reflect upon your printed chapters, and also to see the remainder of the work. But I cannot delay expressing the pleasure with which I find that we have by independent paths reached conclusions which are nearly if not quite the same. I flatter myself with the hope that the unity of our results arises from the best cause, namely, that we have both reached the truth, which must be one. After receiving your very friendly letter of 23d May, and after seeing a full statement of your mode of arriving at the equations of exchange, I cannot for a moment entertain the least doubt of the entire independence of your own researches as regards my own.

"As to the question of priority of publication, it is of course of less importance than that of the truth of the theory itself. But I confess that I have always in my own mind attached much importance to this mathematical theory of economy, believing it to be the only basis upon which an ultimate reform of the science of political economy can be founded and a solution of many difficult problems effected. I cannot, therefore, help accepting your very kind offer to make known in the *Journal des Economistes* or otherwise the fact that I had already gone over part of the same ground as yourself, although in a different manner. I must add that I feel it to be most honourable in you, after seeing merely

the brief sketch of my theory as printed in the *Statistical Journal* for 1866, to acknowledge at once my priority on some points; and I shall be glad to learn your opinion of the much fuller statement of my views contained in the *Theory of Political Economy*, of which I have lately posted you a copy.

"For my own part I shall have much pleasure in doing what I can to make known in England your own excellent statement of the theory of exchange, and to show my high estimation of your friendly conduct. I trust that the theory of exchange will thus become the origin of the exchange between us of many friendly letters."

To his sister Lucy.

122 GOWER STREET, LONDON, W.C.

"We are settled in comfortable lodgings at the above address, and shall probably be here for a week longer. I think we shall have a good time of it, and I combine a little business with a good deal of pleasure. This evening I go to dine with the Political Economy Club for the first time since they made me an honorary member, but the subject is one about India, on which I do not see how I can have anything to say. To-morrow I am going to the annual visitation of the Greenwich Observatory, when one has a good opportunity of seeing the place. . . .

"The worst of coming to London is that it makes me wish to live here altogether, the libraries are so attractive. I have already been once to the Royal Academy, and like the show of pictures much on the whole, including the celebrated picture of Miss Thompson. I am probably going again this afternoon.

To his brother Tom.

PARSONAGE ROAD, WITHINGTON,
19th June 1874.

"Your agreeable letter of 14th June was received a few days since. I need hardly have said that it was agreeable, as yours are always so, and serve to cheer me.

"Thanks for sending the books. . . . I think you are quite right in deferring any remarks on *American Currency* until there is something fixed. It will be next year before

the book is done, I feel sure. In the meantime there are many little points you might inquire into, quite useful in any case. I want to know—

"1. What is the nature of a certified cheque as used in New York?

"2. Are they much used, and are they used in other towns of United States?

"3. When a cheque is certified, is the banker justified or obliged to retain a sufficient deposit on the part of the drawer to provide for it; or is it merely a kind of general acceptance of a bill upon himself, that is, the banker?

"It might be very useful if you could get access to the banker's clearing house in New York, and send me a few notes as to how they do the business—especially whether they still make payments in coin or notes. If you could get copies of the paper forms employed, it would be very valuable.

"I have lately visited the London clearing house by the aid of Sir John Lubbock, and have been much interested both in that and the small Manchester one. I should also like to know whether any, and if so, what coins circulate in the States now?

"We spent nearly two weeks in London pleasantly for the most part. . . .

"I am going again into the subject of mortality, and the effect of the Irish population on mortality in English towns. The volume of the *United States Census* which you gave me has just supplied some data quite countenancing my theory. Thus in the States of higher mortality the proportion of Irish deaths to all deaths is 8 per cent. In the States of lower mortality the proportion of Irish deaths is only 2 per cent, a very striking difference, which quite accords with other facts. Applying the same kind of calculation to German deaths the proportions are 4·4 per cent and 3·0, showing little evidence of any connection.

"I hope your estimate of the *Principles of Science* may prove true in some degree. I have seen a letter from a scientific old lady, Miss Wedgwood, the niece of Charles Darwin, who seems greatly pleased with it. The reviews hang fire very much. I quite agree with you that the

Saturday Reviewer failed to see the connection between the parts of the book altogether.

"I will consider what you urge about a tax on coal. It is much the same as the proposal of Sir Rowland Hill in a paper read to the London Statistical Society, December 1873, vol. xxxvi. p. 565. The paper was not favourably received, and it would be worth your while to read the discussion if you can meet with the journal. I do not feel quite sure about the matter, but must make up my mind, as I have proposed the point for discussion at the Political Economy Club, and suppose I shall have to argue it some time next session.

"I think I can detect a gradual improvement in my health. I still frequently knock myself up, but recover much more rapidly than before, which seems to me a good sign.

"At present I feel overwhelmed with things to do, and our frequent absences from home waste so much time. I have arranged with the college to continue for a session without evening work, leaving future arrangements unsettled."

To his brother Tom.

WITHINGTON, MANCHESTER,
29th June 1874.

"We sail for Norway on 3d July, and I must write a note to say good-bye before we go.

"I have been enjoying much some volumes of music I bought lately, being the trios, quartettes, and violin duets of Beethoven, arranged for the piano, and published in Litolf's edition of his works. You should buy them by all means, and after a little practice you will find them, as might be expected, full of delightful music, not more difficult than his pianoforte sonatas, and of a lighter character in general.

"As regards the book on money, I have now partially promised to have it done by Christmas, so that I should like to know something about American currency, say by October. I have noticed what is said in the papers of recent Bills in Congress. So far as I can make out, they are going to withdraw greenbacks, and leave National Bank currency

almost unrestricted. Unless I misunderstand the matter, I can hardly imagine a worse solution. I should like to know why these banks should have the right of issue? What constitutes a national bank? Is there any limit to what they can issue? Unless there be some careful restriction, there will probably be a repetition of what happened in 1830-40. Does the profit of bank issues go in any way to Government?"

To M. J. d'Aulnis de Bourouill.

CHRISTIANIA, *7th July* 1874.

"I received your very agreeable letter one hour before leaving Manchester for a journey in Norway, and was therefore unable to answer it before arriving here. I sent by post from England a copy of the brief paper on the mathematical theory of political economy printed in the *Statistical Journal* in 1866, to which you referred in your letter. You will find, however, that it contains nothing but what is much more fully described in my book on the theory, and there are some parts of the paper, especially section 15, which I now regard as erroneous.

"Allow me to thank you very much for the kind expressions which your letter contains, and to say how gratified I am that you approve of my efforts to trace out a mathematical theory. It is quite true that what I have written on the subject has received little or no attention in England, and by those who have noticed it the theory has been generally rejected, or even ridiculed. This has not shaken my conviction of its substantial truth, though I have feared that it would take a long time to obtain for it any reception. Until the last few months I was not aware that any attention had been given to my book abroad, and you may therefore believe that I was gratified with what you tell me.

"As to the reviews in the English periodical journals, that in the *Saturday Review* of 11th November 1871 is the most important, and indeed the only one requiring any attention. There was indeed a review in the *Academy* of 1st April 1872, but though more fair than that of the *Saturday Review*, it contained no criticism worthy of your notice. Mr. Cairnes, as you truly say, has failed to

seize the idea of the theory, and his objections are consequently of no weight, though he is usually a most able economist. He has, indeed, stated, both in print and in private letters to myself, that his want of mathematical knowledge prevented him from reading a large part of the book, but that being so, I regret that he has thought proper to controvert the foundation of the theory on false grounds.

"With the remarks of Mr. Carey referred to by you, I am quite unacquainted.

"I am most happy to hear that you propose in a forthcoming work to illustrate the principles of political economy, and present them in a popular form, while preserving the scientific form, which is necessarily a mathematical form. I have felt great difficulty in conveying the fundamental ideas of the theory in at all a popular form, and I shall therefore look with much interest to the book, of which I feel the importance. I am sorry indeed that it will be printed in a language of which I can read nothing, but I may suggest that after completing the edition in Hollandaise you may undertake another edition either in French or English. I shall myself have much pleasure in making known as much as I can, your opinions on this subject.

"I can only regard my own work as a bare and imperfect outline of some of the more important theorems of political economy, and there can be no doubt that a hundred points still of importance remain to be cleared up by yourself or others. The question of the variation of the curves of utility is one of evident importance, and I shall much wish to see how you treat it.

"As to the exchange of indivisible commodities, I feel myself quite unable at present to add anything to what I have said in the book. The conclusion which I adopted in one case, that the ratio of exchange was indeterminate, seemed unsatisfactory, but I could find no other answer to give. If you can suggest a better result, it will remove what may well be regarded as a difficulty in the way of the theory. I am not even yet sure that my statement of the theory is free from errors. Objections have been made even to the fundamental equations of exchange, but the fact that M. Walras has arrived at substantially the same

equation makes it very probable that my statement was correct.

"While I am not aware that my views have been accepted by any well-known English economist, there are a certain number of younger mathematicians and economists who have entered into the subject, and treated it in a very different manner. Among these I may mention Mr. George Darwin, the son of the eminent naturalist; he is a very good mathematician and an acute economist, and his only important objection was to the expression for the *rate of interest*, $\frac{f't}{ft}$, but after proposing one or two more complicated expressions himself, he at last allowed that my expression was satisfactory and simple.

"In conclusion, I must say that I am very sorry that your letter should have remained so long unanswered, but the delay is due to the fact that I was just setting out on a journey when your letter came."

To his sister Lucy.

HAMAR, MJÖSEN LAKE, NORWAY,
15th July 1874.

"It is time that I was writing to tell you of our safe arrival in Norway, and of our proceedings so far. We have just returned to-day from an expedition into the eastern part of Norway, among the pine forests, where we went principally for the sake of fishing in a fine river called the Rena. We reached this little town by railway to the south end of Mjösen, and then by steamboat up the lake. From here a narrow gauge railway runs for forty miles to the north-east, and then by a cariole drive of five hours we reached the station Lösset, where we stayed.

"This station or inn was kept by a rich landed proprietor who owns the country for many miles round, but seems to be obliged by law to accommodate people. We were much amused at noticing the habits of this Norwegian family, who had their sleeping and sitting rooms in one large house, but came three times a day to get their meals in the house at the side where we had a fine large bedroom. At about nine, two, and seven, a large farm bell was rung, and all the men

and other people came home to meals, the family eating in one small room, the servants in another, and ourselves in a third. The family seemed to have nothing to do but sit in a porch all day talking, and occasionally going out shooting or fishing excursions.

"My own fishing was very unsuccessful; for though I went out several times I only caught one fine trout, of which we only ate half at dinner. I think, however, that it was not wholly my skill which was at fault, as other men who came fishing seemed to catch nothing, and it is probable that the large quantities of timber which happened to be floating down the river frightened the fish.

"The forests about Lösset were very pretty, but the trees seem to be nowhere large in Norway now.

"The rivers also had pleasant bits of scenery, but the mountains are quite of an inferior character to those on the west coast. During one or two days we were much plagued by mosquitoes.

"We are going this afternoon by steamboat across the lake to Gjovik, one and three-quarter hour's steaming, and then westward by carioles on the road across the Fille Fjeld, intending to visit again parts of the Sogne and Hardanger Fiords.

"Our voyage from Hull was, on the whole, remarkably agreeable, the wind, though fresh, being eastern, so that the boat rolled slowly and easily. . . . We found on board four or five tourists or salmon fishers with whom we were acquainted on previous trips, including Professor Frankland, the chemist, Roscoe's predecessor at Owens College; Mitchell, one of the firm who make steel pens, a remarkably agreeable man; and Banks, a young doctor and medical lecturer in Liverpool. All the other passengers, some fifty in number, being inoffensive or agreeable, there was nothing to interfere with the pleasure of the voyage."

To his sister Lucy.

BALHOLM, SOGNE FIORD,
8th August 1874.

"I have written so little to you this summer that I must not let another post go without a letter. We have misman-

aged our affairs this time, so that I have missed your first letter. . . . We are, however, having a good time of it in this grand and beautiful place. Balholm is a village on the west shore of one of the principal reaches of the great Sogne Fiord, and in the part which, perhaps, is finest in the whole one hundred and twenty miles which that fiord runs. As seen from our little inn, the fiord resembles a great lake, perhaps twenty miles long, and from seven to fifteen wide, surrounded on every side by steep and gloomy mountains. In no direction are these fjelde less than from 2000 to 3000 feet high, and the higher parts rise to 5000, and are covered with large patches of snow, half hidden in and confused with the clouds. Just behind Balholm runs up a small branch fiord, perhaps two miles long, called the Esse Fiord, which terminates abruptly among nearly perpendicular mountains of the most singular and picturesque forms. We had a beautiful row up there the day before yesterday.

"Our chief excursion, however, was that of yesterday, when we went up the Fjoerlands Fiord, another branch which runs fifteen or twenty miles among the mountains and snow-fields to the north, and terminates with glaciers. We started at six o'clock in the morning with three men to row, and reached the end of the fiord in five hours; then we had a walk of two hours up to one of the glaciers, waited an hour watching the avalanches fall over the rocks, walked back in two hours, Harriet being assisted by a very shaky little cart, and then rowed back in five hours, so that we had a rather long day. We were lucky in having it perfectly calm all the way, and free from sunshine, which is rather trying on the water. The men had made us kinds of couches of straw and rugs in the stern of the boat, so that we lay with tolerable comfort, and read and slept during the ten hours as pleased us at the moment. In this way a boat journey is very agreeable now and then; but of course you are liable at any time to wind, which destroys all your comfort, and may indefinitely prolong the journey.

"The glacier called the Sulphellen Brae was well worth seeing, as it has the peculiarity of being divided completely into two parts, one on the top of the mountains, and the other in the valley below. The ice falls down precipices

several hundred feet high, breaking up into snow again, and making a peculiar thundering sound, which you may perhaps have heard in the avalanches at the Wengern Alp. We saw some ten or twelve small falls of ice while we were there, but there must be very much greater ones at intervals, though we were not fortunate enough to see one. To-day we are taking our ease, with nothing more than a little row in prospect; but we must to-morrow travel rather actively on our way to the Hardanger Fiord, where we wish to see the great Vöring Foss. It is one drawback of Norwegian travelling that the steamboats, upon which we depend almost entirely in these great fiords, go day and night without regard to comfort. The boat by which we go to-morrow is appointed to call here at 3 A.M., but as it is usually very late, it may come any time before five or six. We shall probably trust to the people waking us when the boat is in sight, but in any case it cuts up one's night's rest. When we came down the fiord from Lœrdal it was worse, as the boat was appointed to leave at 1.30 A.M. After a few hours' sleep we got down to the pier at 2 A.M., and then had to wait three hours on the pier or boat before going off. This sort of thing would have distressed me greatly, as indeed it sometimes did, in previous years, but I am glad to say that I now feel the loss of sleep very little. Even the loss of one or two hours *used* to make me feel wretched.

"Before coming here we spent five days at Sande, a very pretty place, one stage from a branch of the Sogne Fiord, where we stayed ten days last year. The weather, however, was very rainy and bad, and the station somewhat solitary, as there were no other English travellers whatever. Indeed, from not being on the most common routes, or for other unknown reasons, we have hardly seen anything of our countrymen and women this year. In this little station inn we are among a large family of native ladies and girls, from the grandmother downwards in age. Though rather a bore, they are familiar, agreeable people, and we have been amused at seeing some of their customs, of which we had only heard previously.

"Our dinner the day before yesterday consisted of boiled salmon and potatoes as a first course, and a curious sort of

pottage, made apparently of milk and small onions and turnips, as a second. The family had nothing to drink whatever except the pottage, and they displayed an indifference in the use of knives and forks and spoons which would be thought dreadful in England. Indeed, in all the steamboats, inns, and elsewhere, it is the proper thing to help yourself with your own knife and fork, and if you can only stick them into something you want, you need not stand upon ceremony. After dinner our Norwegian friends and ourselves all jump up at the same moment, and then it is proper to say, 'Tak for Mad,' that is, 'thanks for the meal.' Properly this should be accompanied by each person shaking hands with each other person, but if strangers are present this is replaced by a little bowing and nodding. I cannot make out the origin of this curious custom. The shaking of hands leads people to think that it is the guests or the children thanking their hosts or parents for the meal, but I am inclined to think that it is a confusion between this and the saying of grace.

"Messrs. Wilson, the steamboat owners of Hull, have just put on a fine large new steamboat in place of a small disagreeable one in which we suffered last year. We have therefore written to take a cabin in this boat, the *Angelo*, for 28th August, and, if we get it, shall hope to be home by about 1st September.

To his sister Lucy.

RAALFHUUS, HALLINGDAL, NORWAY,
20th August 1874.

"Since I last wrote we have heard that some of these wretched strikes in England had delayed the completion of the new steamer, so that her second passage would be one week later. We therefore altered our minds, and settled to leave by the *Angelo* on 4th September, and we have secured a private cabin, so that we hope to have a pleasant voyage, reaching England about 7th September.

"We have now almost completed our tour, except our contemplated visit to the celebrated Riukan Foss. This visit takes us into a new district of Norway, namely, Thelemark, and will occupy about a week.

"When I last wrote we were at Balholm, a beautiful

place on the Sogne Fiord. We left by steamboat about 3.30 A.M. in the morning, much annoyed because the boat, which is often two or three hours late, would come punctually when we wanted to prolong our night's rest, and caused us to be hurriedly wakened, and hastened down to the landing-place. After steaming up two new branches of the great fiord, namely, Sogndal and Aarlands Fiords, both of which, especially the latter, were worth seeing, we went down the grand Nœro Fiord once again, and reached Gudvangen in the middle of the day.

"We were again annoyed to find that a large German party of six or eight also landed there, so that there was every probability of a scarcity of horses next morning. We therefore determined to drive at once to Vossevangen, on the way to the Hardanger, and we went on in the company of three English, one of whom, a Mr. Venn, turned out to be a London University man, remarkably well read in all branches of philosophy. We were rather favoured by the weather, and got over the thirty-two miles in eight hours. Although it was the third time of passing along the road we admired the scenery more than ever, but it is hopeless to try to give you any idea of it, when the photographs miserably fail.

"As we did not arrive till after ten at night we had a day of nineteen hours' travelling. After driving to Eide, on the Hardanger, the next day, our intention was to go by steamboat next morning at 5 A.M. to the Vöring Foss, but when called at 4 A.M. I collapsed, and decided to go to sleep again. Harriet was in consequence disappointed of her visit to the great foss, for which I was very sorry, but as it involves a fatiguing ride of many hours, it was perhaps prudent to give it up.

"After resting two days at Eide we took the steamboat at 5 A.M., and made the tour of the upper part of the Hardanger, seeing the Eidfiord and other parts which we had missed on a previous visit. One of these places was Ulvik, which struck us as one of the loveliest spots on earth. Situated on the grassy slopes at the bay-like end of a short branch of the fiord, it is surrounded by pine-covered hills, which would be called mountains were it not for immense precipitous mountains which towered above them,

so that there was a fine contrast between the bright green fields on the shore of the fiord, the pine region above it, and the rocks crowning the whole. Here occurred a rather amusing incident. As the steamboat came alongside the pier about 9 A.M. the inhabitants of the little village were assembled for the usual gossip, the steamboat arrival being the only excitement which distinguishes one day from another in these quiet places. Among the people were soon distinguished two young women of remarkable beauty, both in elaborate Hardanger costumes, one as a bride or married woman with her elaborate white cap and gilt belt; the other, who was still more pretty, as an unmarried woman with two very long plaits of hair hanging down. I observed that all the male passengers on the steamboat gradually collected at the head of the vessel where these girls could be best observed, and one German was seen to go ashore and inspect them closely with his eyeglass. I was much amused to find out some days afterwards that one of them was the daughter of the Mayor of Hull whom we were to have called upon in Bergen if we had gone there, she being a friend of our friends in Hull, and the mayor having very civilly called upon us in Hull. The other girl was one of her friends from Bergen with whom she happened to be making a little tour in the Hardanger, and they had dressed in the Hardanger costume as a little 'lark.'

"We got back to Gudvangen on the Sogne Fiord just in time to secure the last vacant bedroom from our friend Schultz, the hotel-keeper.

"We have visited these places so often that we are quite on familiar terms with the people at the inns, and we have found this pleasant and advantageous, as they welcome us back and do the best they can. As the steamboat goes only once a week, very stupidly, there is usually an aggregation of tourists; but on this occasion there was an extraordinary number for Norwegian villagers to accommodate, probably not less than fifty, in two little inns.

"At Vossevangen we had left in the morning a dreadful large party of eight people, who had robbed us of some hours' sleep by their noise, and who were avoided by all the tourists in Norway on account of the noise and trouble they

occasioned. Although I had made some remarks to him on the subject, the father of the party seemed to have no idea that it would take eight hours to drive four stages of eight miles each; and so they started in the afternoon, having heavy rain all the way, and the last and most beautiful stage in the dark, having to walk most of the way for safety sake. At 11.30 P.M., when just going to sleep, a great noise of knocking at doors and giggling of girls and shouting to the landlord announced their arrival in pouring rain. . . .

"'On reaching Lœrdalsören at 6 P.M. it was our turn to get into trouble. In order to avoid a pressure of tourists and a disagreeable stopping-place, we had arranged with a man who had furnished us horses on two previous occasions to bring two horses down to the boat, so that we could at once drive up country to a comfortable station. The horses were duly there, but just as we were leaving we learnt for the first time that we could not go more than one stage with them. The Lœrdalsören hotels being then in all probability full, the odious party of eight having taken possession of the only one we could go to (the landlord of the other having previously cheated us), we were obliged to proceed. At the end of the first stage, at 7 P.M., there were many travellers and few horses, and no bedrooms. After bargaining and remonstrating for an hour, we finally succeeded in getting one horse at a rate considered quite extortionate here. We reached Husum, the next station, at 10 P.M., only to find every bed taken, and four Germans in possession of the only sitting-room. It was nearly dark, and the station-master declared there was no prospect of horses. Our own man would not hear of letting his horse go another hard stage that night, so that there seemed every prospect of sitting on the doorstep all night. After a time, however, we got possession of the sitting-room table, and secured a light supper, in which we were shortly joined by three other very pleasant English travellers in the same position as ourselves. Presently, however, it turned out that the landlord had horses if we would pay for them; and towards twelve o'clock we all five set out for a long dark drive in three small vehicles. It would not be easy to forget this drive, as for a considerable distance the road overhung a

roaring torrent, with only a few upright stones to guard the edge. At one place the road, perhaps for a quarter of a mile in length, is cut out of the side of a precipice bounding one side of a tremendous but narrow gorge, with a river falling in cataracts a hundred feet below. It is altogether perhaps the wildest and grandest piece of road which we have ever seen in Norway; but as I had three times previously driven over it in the day-time I undertook to drive first, and the other horses followed.

"*Kongsberg, 24th August.*—We reached this little town last night after a tedious steamboat and railway journey from Gulsvik, at the head of the Kröderen lake. It is a slow little place, although it has a mint, which we went to see this morning.

"I was very glad to receive last night your letter of 5th August, forwarded from Christiania, which the girl told us at this hotel that they had been offering to visitors for some time past.

"Please tell Grindal that when I caught a small trout one day, and put it back among some stones in the river, I saw an eel come from among the stones and seize the fish and drag it away. Then taking hold of the fish's tail I pulled both suddenly out of the water, but the eel soon wriggled back. The next day I wished his Aunt Harriet to see the eel also, so I put a small dead fish in at the same place. After a little time the eel came out again, tried the fish, found it was dead, and went in again.

"The letter which you forwarded is interesting and important to me. My theory of political economy is making way very well on the Continent, and is likely to appear both in French and Dutch."

To his sister Lucy.

VITTORIA HOTEL, HULL,
Monday, 7th September 1874.

"We arrived safely in Hull last night after a rather rough passage. . . . Had it been finer we should have had a very agreeable passage, the steamboat being a very fine one, and many of the passengers agreeable people. Among them was Mr. Hussey Vivian, M.P., who was my chief opponent in the Coal Question, and who moved the resolu-

tion for a royal commission; and I had an interesting discussion on the subject with him.

"We had an awful piece of work landing by steamboat in the dark, and it was almost two hours before we could get to this hotel and secure all our luggage.

"We felt much regret in leaving Norway for a long time, and our last few days were spent very agreeably in an inn some thirty miles from Christiania, in a charming spot upon the Tyri Fiord."

To M. J. d'Aulnis de Bourouill.

PARSONAGE ROAD, WITHINGTON,
MANCHESTER, *9th October* 1874.

"I hope that you safely received my former letter, written from Norway, in reply to your letter of 29th June, and also the copy of a printed paper which I posted from Hull when on the point of leaving England.

"I have now returned from Norway, and am again engaged in my usual work. I am about to prepare a memoir, to be read at the Statistical Society of Manchester, upon the subject of the mathematical theory of political economy, and if the book which you are proposing to publish is sufficiently advanced, I should much like to draw the attention of the Society to it.

"You have stated that your dissertation would be ready in September, but I presume that some of those unavoidable causes of delay, which so often occur in publication, have hitherto prevented its appearance. I look forward with much pleasure to becoming acquainted with your improvements and additions to the theory.

"Since receiving your letter I have reflected much upon the point which you mentioned, namely, the exchange of indivisibles; but I cannot say that any mode of improving what I have said in the book has occurred to me, and I await your criticisms on the treatment of it with interest.

"While it is no doubt necessary to work out the theory with fulness and correctness by degrees, yet I think that we need still more at present to make known its simple principles, and show that the notions of value, utility, price, etc., may be made more precise, and may be explained thereby.

"I have now received a copy of the first part of M. Walras' treatise, and find that it has been very ingeniously thought out and written. He has, I think, discovered the true principles of the science with the greatest insight and ability, and I shall be truly sorry if he experiences any disappointment at not being quite the first in the field. But, as he remarks, his formulæ and general mode of treating the theory are complementary to mine, and both books serve remarkably to confirm and supplement each other. What I mainly regret about the form of M. Walras' book is, that it is in no way adapted to make the principles of the theory more popularly known: it seems almost worse in this respect than my own book. Therefore I feel sure that there is the greatest need of a book to illustrate and explain the new view of the science, and this, as I understand your letter, will be accomplished by your work. I hope, however, that your treatise will not appear only in Hollandaise, but will be translated into French, if not into English, so that it may have a wider range of readers."

To Rev. John Venn.

PARSONAGE ROAD, WITHINGTON,
9th October 1874.

"I have been reading your review of the *Principles of Science* in the *Academy* with the greatest interest and gratification, and have to thank you warmly for the careful and impartial way in which you have treated my poor volumes. Passing over the points where you indicate more or less agreement, I should like to notice briefly the objections which you raise, not with the object of taking up your time in controversy, but simply to explain the difficulties under which I lay.

"Mill's so-called Inductive Methods were certainly given in my *Elementary Lessons*, but that work was only intended as a small introductory text-book, in which it was impossible to discuss the exact value and nature of doctrines commonly accepted. What Herschel and Mill treated as the special methods of induction are by me treated under the head of *experiment*. It seems to me, rightly or wrongly, that they are rather rules for observing or experimenting, so as to gain facts from which hypothetical reasoning may after-

wards extract laws and principles. The process of induction proper is, on this view, what I have treated in chapters xxii. to xxvi. I quite agree with you, however, that much vagueness attaches to the name *induction*, and I think it very likely that I have not used the word always in exactly the same sense. My only excuse can be that even Mill seems to me to have used the word loosely—indeed, he wavers very much, and calls geometry, for instance, sometimes deductive and sometimes an inductive science. To the want of a psychological analysis of the basis of reasoning I plead guilty. On this point the *Spectator* raised almost exactly the same objection as yourself at the same time. No doubt to a considerable extent I have avoided the true difficulties of the subject, but this does not preclude me from attempting to remedy the defect at some future time, if I live long enough, and can feel that I see my way to a more settled state of opinion. My efforts have been directed principally to arranging in order the more formal and mechanical parts of logical method, which may be useful in itself, though only a preliminary task to a more profound discussion of the bases of knowledge. The main point on which I should venture to differ from your criticisms refers to the symbolic method and its usefulness. It is a matter which cannot be adequately discussed in writing, but I would remark that the principal question is whether or not the symbolic processes correctly represent the relations of classes of things and the course of our thoughts about them. If not, the symbols must be given up, or modified until they do. In short, I venture to look upon them as an essential mode of expressing a true system of logical forms, not meaning of course merely the general letters A, B, C, etc., but any corresponding use of words or signs for expressing the like general relations of terms.

"No doubt I have not adequately noticed Mill's objections to 'Quantification,' but I felt that to enter into discussion and criticism would add too much to the length of an already heavy and costly book.

"With regard to your example of possible confusion at bottom of third column, p. 382, it seems quite possible that a student might make the mistake suggested, but it would be

by a breach of the rule of substitution, by substituting 'consequence of gravity' for 'consequence of gravitating matter,' there being no warrant whatever for this substitution. Thus I do not see that the strict scientific generality of the principle of substitution is impeached, or indeed intended to be impeached. In the next column you have given a very nice example of a logical question, simple, yet perplexing, without some method of symbolic analysis.

"I have to thank you for pointing out oversights about Encke's comet. It is obvious now that I have committed a blunder in the *Elementary Lessons*, which no one had before pointed out. The angular velocity of the comet is increasing, so that of course it returns each time a little sooner than it would without resistance. The resisting medium produces an effect which would, in the absence of solar attraction, produce retardation.

"This and some other requisite corrections, which you point out, shall receive the closest attention, if ever the time arrives when a second edition becomes possible."

To M. le Professeur Bodio, Directeur-Général de la Statistique du Royaume, Roma.

THE OWENS COLLEGE, MANCHESTER,
12*th November* 1874.

"I have been informed by my correspondent, M. Léon Walras of Lausanne, that you take an interest in the mathematical treatment of the science of political economy, and that you are inclined to look favourably upon attempts to reform the science. I have, therefore, been encouraged to forward to you by book post, registered, a copy of my work on the *Theory of Political Economy*, published in 1871. This work was very unfavourably received in this country, and almost the only English economist of importance who noticed it, namely, Professor J. E. Cairnes, repudiated it altogether.

"Nevertheless I am quite convinced of the substantial truth and importance of the views put forward, and am much gratified to find that the profound and ingenious researches of M. Walras, pursued as they have been in an independent manner, lead to the same conclusions.

"This remarkable coincidence of results emboldens me to bring the book to your knowledge, in the hope that it may receive the approval of yourself and of some of the other distinguished representatives of the science in Italy."

To his sister Lucy.

PARSONAGE ROAD, WITHINGTON,
19th November 1874.

". . . My books are beginning to pay at last. The little *Lessons* sells 2500 copies a year, and is now paying about £70 a year. Three other books pay about £3 : 10s. between them. I think I am going to write more school or college books. I hear that my *Theory of Political Economy* is going to be translated into Italian. I am much oppressed with the too abundant exercises of my logic class. . . ."

In November 1874 Mr. Jevons read an important paper to the Manchester Statistical Society on "The Progress of the Mathematical Theory of Political Economy, with an Explanation of the Principles of the Theory." He began by calling attention to the remarkable fact that M. Léon Walras had, at a later date than himself, but quite independently, and by a different course of reasoning, reached the chief result of the mathematical theory. As "this fundamental formula of the science of economy is far from being of an obvious character," the coincidence could not possibly be due to chance; and therefore furnished a very strong proof of the truth of the theory. Though his own book had up till that time met with a discouraging reception from economists in England, he had the pleasure of knowing that the new theory *had* already received much attention on the Continent, "where the prejudice against the abstract and mathematical investigation of political economy seems to be much less than in England."

To G. H. Darwin, Esq.

PARSONAGE ROAD, WITHINGTON,
24th November 1874.

"I shall be very happy to read anything you have written about the theory of political economy, though it

would be more to satisfy my own curiosity than because I should be likely to suggest any alterations.

"It is very gratifying to hear that you are so clearly in favour of the mathematical treatment of the subject, as it would be difficult to meet with any who join mathematical and economical knowledge and ability in a manner better calculated to allow of forming a sound judgment than they are joined in you, as I am well assured.

"I much regret that Cairnes should have raised such absurd objections to the theory, proceeding entirely from misapprehension. His remarks may temporarily prejudice the theory, and it would be a great advantage if you would thoroughly refute them, without using too many mathematical symbols, so as to frighten readers away. I am more afraid of this with English readers than of Cairnes, and I think his objections may serve as a good opportunity for explaining the principles of utility.

"I do not know whether you have seen my paper on the subject, read to the Manchester Statistical Society, but in case you have not, I send a paper containing a copy of it.

"Walras' method may be rather intricate, but it is ingenious, and I think sound. There are also certainly some valuable novelties in his book, but I have not studied them very closely yet.

"*P.S.*—I now have a Dutch treatise on the theory of political economy, by d'Aulnis de Bourouill of the Leyden University."

To M. J. d'Aulnis de Bourouill.

PARSONAGE ROAD, WITHINGTON,
MANCHESTER, 25*th November* 1874.

"I received the very welcome copy of your dissertation about two days ago, and write to say how much pleased I feel that you have thought it worth while to treat so fully of the mathematical theory of political economy.

"I regret very much that I am quite unable to read the book or follow the argument to any extent. Fortunately the Dutch and English languages are very closely akin, and the Norse is evidently closely related to both, so that I can here and there gather the meaning of a few sentences. I am

intending to borrow a Dutch dictionary, which will enable me to go farther. However, the notes, diagrams, and other indications show me very often the nature of the discussion, independently of the statements in your last letter. Your work is written, I should think, in a manner well calculated to secure attention to the subject, and I wish that I could study the additions and improvements which you have made.

"I am particularly curious to know your theory about the exchange of indivisibles treated in the appendix. If you have now more leisure time, could you give me a slight sketch of your way of treating the subject?

"I feel what an advantage it must be to have a command of so many languages as your countrymen. Those whom I have met in travelling were often remarkable linguists.

"I have sent you a copy of a newspaper containing a report of a paper I read to the Manchester Statistical Society, and I will send you a formal copy when printed.

"I am desirous of offering for your acceptance a copy of my book on logic, the *Principles of Science*, but should like to know exactly to what address it should be sent, and whether you will be in Leyden to receive it.

"Is the work of M. Van Houten written in French? If so, and in fact in any case, I should like to have its exact title. I hope some time or other to form an historical sketch of opinions bearing on utility and value, and it would be necessary to introduce his views.

"Would it be too much trouble if I were to ask you to send me the exact addresses and names of a few of the most eminent economists of your country, to whom I might with advantage send copies of any papers referring to the theory of political economy?

"In asking you to explain your theory of exchange of divisibles, I did not overlook the brief explanations which you have already given, that it is the poorer purchasers which determine the price for the rich. But this can only apply where there are many articles of a similar character, and it will not, as far as I can see, overcome the difficulty alluded to in p. 122 of my book, of an isolated exchange of indivisible objects of value.

"In sending a copy of my book on logic, can it be

delivered at Bois le Duc by railway, or will it not be better for me to send it to some address at Leyden? It will be too heavy to go by post."

To G. H. Darwin, Esq.

PARSONAGE ROAD, WITHINGTON,
29th November 1874.

"I have read your article with much interest, and am glad to find that you almost perfectly agree with me. I have made a few marks upon the paper, but none of any consequence. All that I have to say about the form of the article is that it can hardly be called, as it stands, a review of Cairnes' book, but rather a defence of mine. If you publish it as a review of Cairnes' it would clearly be desirable to say something more, in fact much more, at the beginning about the excellences of other portions of his book. There can be no doubt of the value of Cairnes' discussions of many questions, though on the theory of value I think him so unfortunate.

"As regards the channel of publication, you know quite as well as I do what is best, and I should hardly like to make suggestions.

"I have been reading your article in the *Contemporary* with much interest, and am glad to find the puerile style of Max Müller's reasoning (as it has always struck me) so well shown up. It is impossible not to admire his flow of learning, and his agreeable and instructive style. He has done an immense deal for linguistic study in England, but when he approaches theory or argument he makes the most extraordinary blunders.

"It is curious you think your handwriting bad. I think I have seldom or never read a more legible paper. It is almost as easy to read as type.

"When you have time, I wish you would consider the mathematical nature of the equations (*Theory of Political Economy*, pp. 99-101, etc.) I have a standing difference with my friend Barker, who says they are (or at any rate ought to be) different equations demanding integration, whereas I hold that, though deduced by the use of differentials, they are simple algebraic equations. The problem, as

I regard it, is a statistical one, closely analogous to that of the lever as treated according to virtual velocities.

"I have to be in Cambridge at the end of the week for the Moral Science Tripos examination, and may perhaps have the pleasure of making your acquaintance."

In the spring of 1874 Mr. Jevons had been asked to be one of the examiners at the Moral Science Tripos at Cambridge for the years 1874 and 1875, and he had much pleasure in agreeing to the request. This was the first visit he paid to Cambridge.

To his sister Lucy.

BULL HOTEL, CAMBRIDGE,
6th December 1874.

". . . We spent about two days in London, rather successfully, and came here on Saturday afternoon. We have not yet been out into the streets, but the town looks very interesting from the window. We have had a great many visitors already, and they seem to come at all hours. We have invitations already for most of the days we shall be here, and are not likely to be dull. The examination work is fortunately much lighter than I expected, as there are practically only thirteen men and two women candidates."

To his sister Lucy.

WITHINGTON, *16th December* 1874.

"Thanks for your letter received at Cambridge. We were so busily employed there that I had no time to answer. We only returned last night, having had perhaps the pleasantest visit to a place that I can remember. Not only were the college buildings and chapels very interesting, but the people were exceedingly kind, and we made a great number of new acquaintances, chiefly among the college tutors and lecturers, with two or three of the professors. I think we were at a breakfast or luncheon or dinner party almost every day, and sometimes two, and I was greatly pleased with dining in the college halls several times. Harriet, of course, could not accompany me there, but she went one evening to Trinity College Hall to see the dinner from the gallery. We were also greatly pleased with the college chapels, which we frequently attended."

To W. Summers, Esq.

PARSONAGE ROAD, WITHINGTON,
16*th December* 1874.

"On returning home after a few days' absence I am pleased to receive your letter containing a copy of a letter which you addressed to the *Examiner* newspaper. I have read the latter with much interest, and am naturally gratified to find that you consider the remarks of the *Examiner* ill-considered and erroneous, to say the least. I fear it is impossible to criticise Mr. Mill's writings without incurring the danger of rousing animosity, but I hope and believe you are right in saying that I have said nothing from petulance or passion. Whatever I have said or shall say of Mr. Mill is due to a very long consideration of his works, and to a growing conviction that, however valuable they are in exciting thought and leading to the study of social subjects, they must not be imposed upon us as a new creed. We may profit by their excellences, and there is no fear on this point; but we may also suffer from their defects."

To M. J. d'Aulnis de Bourouill.

WITHINGTON, MANCHESTER,
23*d December* 1874.

"The Messrs. Macmillan inform me that they have forwarded a copy of my book on logic, *The Principles of Science*, addressed to Bois le Duc. I directed that the cost of conveyance should be paid to the destination, and I hope that you will duly receive the book.

"I am much gratified to hear that M. Laud, the professor of logic at Leyden, approves of the work, which cost me far more labour than the *Theory of Political Economy*.

"Having recently seen Mr. George H. Darwin, a son of the well-known Charles Darwin, and a very clever mathematician and economist, he expressed a great desire to see your dissertation, as he can, in some degree, read your language. I have therefore lent him my copy for a time. I wish that there were more people in England able to read it.

"I am informed by Professor Boccardo of Genoa that he proposes to translate my *Theory* into Italian. I shall in the course of two or three months draw up some little alterations

and improvements, and I should be very glad to know whether you will point out the places which need alteration most.

"The paper for the Manchester Statistical Society is in course of being printed in the *Transactions*, and when finished I shall have the pleasure of sending you a copy.

"Please do not put yourself to any inconvenience concerning the note of the contents of your dissertation, which you kindly offered to send. It will be very interesting to me when you are able to write it, but I fear it is taxing you too much to expect it. Such a statement would, however, enable me to refer more fully to your work in England."

To G. H. Darwin, Esq.

PORTICO LIBRARY, MANCHESTER,
2d February 1875.

"At the earliest possible moment after reading your article in the *Fortnightly*, I write to say how warmly I thank you for so boldly taking up the cause of the *Theory*. Not only must your article give new courage to those already believing in the possibility of applying mathematical methods to economy, but it must go far towards silencing those who have hitherto ridiculed the notion, and opening the eyes of those who have been entirely blind. It seems to me just the kind of article likely to do most good in counteracting the ill-considered criticisms of Cairnes.

"I quite agree with you that Cairnes' own speculations on value are probably much more sound than his objections to other people's speculations, but I have of late been so much occupied in other reading that I have really not read his book properly, and look forward to the pleasure of studying it with care. I expect to find it confirmatory on the whole of the mathematical theory.

"The Dutchman seems to read the *Fortnightly* much more regularly than I do, and will be pleased to see that you favourably mention his book.

"I have posted a copy of my paper to Beckenham, not knowing whether you are there or at Trinity College.

"I hope to see before long your paper on production, a new theory of which will be a true novelty. I cannot say I have hitherto been able to conceive the line you take."

To H. S. Foxwell, Esq.

PARSONAGE ROAD, WITHINGTON,
7th February 1875.

"I have been very much interested in your letter concerning my paper. It has told me much, which I had no previous means of knowing, concerning the ideas current in philosophical subjects in Cambridge. I was not aware that Marshall had so long entertained notions of a quantitative theory of political economy, and think it a pity that he has so long delayed publishing something on the subject.

"It is, of course, open to you or him or others to object to the special way in which I have applied mathematics, and I should like to see other attempts in different directions, but what I contend is that my notion of utility is the correct one, and the only sound way of laying the foundation for a mathematical theory.

"In regard to what I have said of Mill, I must allow that I should not have expressed so strong an opinion had I been thinking only of his political economy. There is much that is erroneous in his *Principles*, and he never had an idea what *capital* was, but the book is not the maze of self-contradictions which his logic undoubtedly is. If you have not examined his logical theories very critically, you will hardly be aware that upon the principal points he usually holds from three to six inconsistent views all at the same time. It is to this I allude in reality, and in the course of a year or two I hope to make it apparent.

"I have not yet read enough of Cairnes' book to form any opinion about it as a whole, and though I cannot think much of the beginning, I did not suppose it was as shallow as you say.

". . . To give you a slight clue to Mill's logical maze, I may mention that in regard to the nature of geometrical science he states in one place or other the following opinions;—

1. It is entirely inductive.

2. That though usually called inductive, it is improperly so called.

3. It is the type of a deductive science.

4. That there is no opposition between deduction and induction.

5. Geometry is deductive as opposed to experimental.

6. Nevertheless geometry is experimental, and all the truths of geometry can be verified and proved by actual trial.

7. As the experiments of geometry cannot be perfectly performed, we substitute mental experiments.

To M. Léon Walras, Lausanne.

14th February 1875.

". . . I think that a considerable change of opinion is taking place in England. Various correspondents express their acquiescence, and some of the professors are beginning to bring the theory before their students. When I was in Cambridge two months ago I found that the subject was much better understood there than I had supposed, and I have little doubt about its gaining ground gradually. . . .

"I have no doubt whatever about the ultimate success of our efforts, but it will take some fighting; the disciples of J. S. Mill being bitterly opposed to any innovation upon his doctrine. I have already been very severely criticised for what I said about him by the London *Examiner*, which upholds his views, but I am going to criticise J. S. Mill without the least fear of the final result."

To his sister Lucy.

PARSONAGE ROAD, WITHINGTON.

". . . I am getting on very fairly on the whole, but incline to be rather overworked, and sometimes have neuralgia in my neck, which comes on in my lectures, and makes me very nervous. The proofs of my new book on money are coming very fast, and I have two or three more books in my head. I suppose I shall write as long as I live, but how long that will be I cannot tell.

". . . I am very sorry I have not more time for writing, but I have had a good deal of correspondence lately with other people that I am obliged to attend to somewhat; and with my book and lectures, I feel hardly able to find sufficient time and strength. But you must not suppose I am unwell, as on the whole I gradually become better, and Morgan told me the last time I saw him that I could now insure my life."

The Easter holidays were spent with his sister at Ludlow, and whilst there he wrote the following letter:—

To E. J. Broadfield, Esq.

GRAVEL HILL HOUSE, LUDLOW,
31*st March* 1875.

"You will be interested to hear that I yesterday sent Neild my resignation of the professorship. I have nothing particular to say about this step, except that I think it will be much better for me in the end, though of course it lessens my income to some extent. I have always felt that it was a considerable strain to meet a class and discuss questions of the difficulty and width, which I have professed to treat, for some time back. It is in fact an absurdity that one man should have the whole sphere of the logical, metaphysical, mental, moral, and economical sciences upon his hands, or rather upon his head.

"I intend to move to London as soon as I can conveniently get rid of my present house and find a new one there, but it may be a year before I can carry this out. There will be very great advantages, in a literary point of view, in being in London, and there is no fear of my being idle.

"We are enjoying here the first spring day. This is a beautiful place, both as regards the town and country. There are very pretty walks in all directions, and the Whitcliff and Castle Hill are, I think, unrivalled in England for picturesqueness.

"There is one thing which will much trouble me in leaving Manchester, and that is not seeing you so often as I hitherto have done. But I may still hope to see you occasionally, and you must visit us in London every now and then.

"There is much which makes me very sorry to leave Owens College, but at times we must have the courage to make a change, however painful it seems at the moment, and I have thoroughly satisfied myself that I must now move."

In spite of his firm resolve to give up his professorship, at the time he wrote this letter, the Council of Owens

College expressed so much regret at losing his services, that he consented to withdraw his resignation for the present. His improved health enabled him to undertake more work than he had done for the previous three years, but it was the opinion of those who knew him best that it would not be wise to continue the duties of his professorship long. Although he was in future only to lecture one evening a week at college, his private work seemed continually on the increase; and writing was so much more congenial to him than lecturing, that he did not wish to limit it, as he must do if he continued his lectures and also paid due regard to his health.

To H. S. Foxwell, Esq.

36 PARSONAGE ROAD, WITHINGTON,
MANCHESTER, 23*d May* 1875.

"The arrangement which you propose with respect to the examinations [at Cambridge] quite suits my inclinations. I should have, of my own accord, chosen logic and political economy. I will, therefore, consider the selection to be settled, unless I hear to the contrary. . . .

"I have thought a good deal about what you say with reference to Mill. It seems to me very undesirable that the world generally should look upon him as the soundest logician, when, as I feel pretty sure, his system as a whole is unsound. But I am too much engaged in other matters at present to write any criticism just now. I have heard several other men, connected with the London University, speak like you, as if the question of the moral sciences hung by a thread, so that they might be thrown over altogether in consequence of the least indiscretion. But I trust that the authorities of the universities are not quite so narrow-minded. Moreover, Mill's eccentric and in many ways, as I believe, really hurtful opinions do much to prejudice people against the sciences which he is supposed to represent. I shall hope, however, to have further opportunities of discussing such matters with you."

During the first week of June he went to London for a day or two to attend a meeting of the Political Economy Club, at which he had been asked to open the discussion.

To his Wife.

SCIENTIFIC CLUB,
7 SAVILLE ROW, *5th June* 1875.

"The discussion went off very fairly last night. I got on without any difficulty, and was quite fluent most of the time. I tried particularly to wind up so that the club should know when I had done, but failed entirely. When I left off there was a dead silence of several minutes, and Leslie, sitting next me, remarked that he thought I was going to begin again. The discussion was somewhat spirited, though tending to become conversational at times. The preponderance of opinion was strongly in my favour, though the chairman, old Edwin Chadwick, was much riled at my ideas, and answered them at much length and as strongly as he could.

"Sitting next me was a Mr. Horace White, a well-known American, who seemed to be editor or proprietor of the *Chicago Tribune*, and spoke of the Mr. Lloyd who writes as a young man in his office; opposite was another American guest whom I thought I knew the face of, and he turned out to be MacCulloch, the former treasurer of the United States, whose portrait is on the greenbacks. Another guest was Lord Fortescue, a pleasant man, but poor speaker. The debate was much interrupted by a great noise outside the window in the yard, and by Newmarch, who every now and then blew up the waiter and rushed about calling for the proprietor to stop the noise.

"This morning I got to the Academy soon after nine, when the rooms were quite cool and nearly empty, and had a long comfortable look at the pictures for nearly three hours. The greater number of the pictures strike me as being almost worse than ever, and there are very few really good ones. There is, however, one very wonderful one, the Assyrian Marriage Market, representing the sale of a number of young women, who are ranged in the front of the picture in order of beauty. The whole details and idea are perfectly worked out, somewhat in the manner of Holman Hunt, but I believe that the artist (A. Long) beats Hunt altogether. Miss Thompson's picture may have some signs

of cleverness in it, but is very disagreeable, and not much worth looking at.

"This club is a convenient sort of place, and I am glad I joined it.

"I have spoken a little about the University College, London, professorship both to Robson, the secretary of the college, and to Courtney. It is quite evident that I have the refusal of it, and they much want me to apply."

Mr. Jevons was very sorry that he did not know, before he withdrew his resignation at Owens College, that the professorship of political economy in University College, London, would become vacant in October. Having agreed to remain at Owens College for some time, he was uncertain what to do. The difficulty was finally overcome by the Council of University College appointing a temporary lecturer for the session 1875-76.

To his Wife.

VICTORIA HOTEL,
EUSTON SQUARE, *6th June* 1875.

"After writing to you yesterday I went down to Westminster Abbey, and found that there was going to be a special choral festival with a choir of 550 men. After waiting an hour and a half I heard some grand organ music. The organ has been moved and, I think, much improved since I last heard it, and strikes me as being now almost unsurpassed for sweetness and beauty as well as being powerful. Perhaps the size and form of the building add to the effect.

"Afterwards I spent a few minutes inspecting my old corps, the Queen's Westminster, as they were assembling for a march out. It reminded me of former days, not so bright as these to me.

"I am going to the Temple Church for a short time this morning."

During the long vacation Mr. Jevons spent a few weeks at Llandudno with his wife, and before the end of their stay he paid a brief visit to Ireland by himself.

To his Wife.

MACHEN'S HOTEL, 12 DAWSON STREET,
DUBLIN, *5th August* 1875.

"I have had a fine day, seeing nearly all that is most important in Dublin. My only fear is that I have been doing too much. What has pleased me most is the collection of Irish antiquities of the Royal Irish Academy, which is a few doors off in this street. It is an admirable collection, and the series of gold collars, fibulæ, head ornaments, and ring money is superb, not to mention the jewelled shrines and the celebrated Tara brooch, which is admirable. These collections and the manuscripts of the Brehon laws, the Annals of the Masters, etc., are worth coming to see.

"Trinity College was almost entirely shut up for the vacation, and the porter was rather grumpy till I told him I was a professor, when he relaxed and showed me the museum with the celebrated harp of some old king, and a fine collection of South Sea, Australian, and other weapons made by Captain Cook.

"Dublin is said to be more full of visitors, and more lively, than any one remembers. More than once I have been asked for information by strangers, and to-day had to tell a man the name of Stephen's Green. I was on the top of a tram car taking an excursion wherever it might lead, and found that he was doing just the same. I have been in and out of Stephen's Green so often that I am as familiar with it as if I were born and bred there. Sackville Street I know as well as Regent Street, and Merion Square better than Belgrave Square.

"The tram cars are most convenient and well conducted, and make me ashamed of Manchester. The car drivers are excellent fellows, infinitely better than London cabmen, and the best guides I ever met. One man apologised to me elaborately to-day because he could not speak as loudly and clearly as he thought he ought to do, in discoursing on the town, owing to a fall from his car. So far, I think, the Irish are a particularly pleasant people to travel among, as much so as Americans. I am much struck with the resem-

blance of Dublin to some of the older parts of London built at the end of the last century or the beginning of this. The suburbs also, which I have yet seen, remind me of London suburbs. It arises, I suppose, from much of Dublin having been built at that time; then it was an independent capital, and a very prosperous place.

"There will be a great show to-morrow in the form of a procession of 50,000 men, or more. This evening all the green articles of any sort which can be found are being rapidly sold out. I have felt inclined to stop and see it, but, on the whole, think it best to adhere to my intention of going on to-morrow morning in good time. I propose to stop at Kildare to see a round tower and some antiquities near the station, and then go on to Cashel, Tipperary, Limerick—I even hope to get to Galway."

To his Wife.

DOBBYN'S HOTEL, TIPPERARY,
6th August 1875.

"I got here after a capital day about 8 P.M. Being a little tired with a long railway journey, fifteen miles jolting on an Irish car, and visits to two sets of ruins, I turned in to lie down for a little time. At nine o'clock a band of music and populace passed the hotel, and I got out to see what was up, and found the whole town illuminated with candles in endless number. Some small houses had as many as fifty, and they graduated from that down to one. The whole of the inhabitants seemed to be admiring the effect, marching about after bands of music, and watching tar barrels burn at the corner of the streets, but they were all very peaceable, and did not seem inclined to break the windows of the half-dozen houses which had no candles. . . . Numbers of people were coming into Dublin by train when I left, and the Dublin men were turning out with green scarfs.

"In three-quarters of an hour I was at Kildare, much amused on the way by the account of Dr. Kenealy's crushing overthrow in the House of Commons, which is the best *ad hominem* argument ever hit upon. At Kildare I was much interested in the round tower, which is very perfect and dis-

tinguished by the door being 14 feet above the ground, evidently for purposes of defence. The cathedral is very ruinous, but is going to be rebuilt to some extent. The Curragh Camp is within two or three miles of Kildare, and a grand review was in progress within sight of the town when I was there, but I did not feel inclined to stay and see what is pretty familiar to me.

"Going on by train at 11.30—post closes this moment."

The last week of August Mr. Jevons spent at Bath with Mrs. Elliott, a relative of his wife, for the purpose of attending the meeting of the British Association, which was held at Bristol. He read two papers there, the first being "On the Progress of the Coal Question," and the second "On the Influence of the Sun-spot Period on the Price of Corn."

To his Wife.

BRISTOL, *26th August* 1875.

"You will be interested to hear that my paper is already read and discussed. I came over here by a 9.10 train which got to Bristol station shortly before 10, but the cabman wanted not less than three shillings up to the meeting room at Clifton, so I took an omnibus, which was so slow that I did not get up till 11 A.M. Then I found, somewhat to my dismay, that my paper had been set down next after the President's address, which was then being delivered. I had not the least expected this, and it was a mere chance that I had brought my diagram. However, I took a couple of sandwiches and a glass of sherry at the refreshment-room in case there should be much delay, and made my way to the section room, which is in a school-room close to the reception-room. Mr. Heywood's address was done not long afterwards. There was great difficulty in getting my diagram up, as the screen was small and inconvenient, and when it was up the lower part could not be seen. I think I read the paper very fairly, and soon lost all nervousness, and it did pretty well. The discussion was active, but was rather cut short by Mr. Heywood, who wanted to limit the number of speakers. However, several insisted on speaking, and one lady would ask a question, and there was a certain amount of liveliness, which was better than having it come to a flat

end. I was sorry my diagram, which cost so much labour, was not better seen."

To his Wife.

BRISTOL, *29th August* 1875.

"I am probably going for a short drive this afternoon with my old college friend Hallett, who wrote lately to me, as you will remember; but I must first write my usual daily note. Thanks for your letter, which was very pleasing to me. I am glad you get on better, but am not quite sure whether I ought to be away from you.

". . . I am writing in the section room, having just finished my second paper. I got into rather a mess about the reporting, as I found that the reporters had got my abstract and telegraphed it everywhere, though I did not purpose to read the paper fully. However, I gave a free statement of the purpose and nature of the paper, which seemed to excite considerable interest. I took great care to make it plain that I did not assert the truth of the connection.

"I may be deluded, but my impression is that my speaking is much improved. My nervousness seems to have disappeared to a great extent, and when I know the subject I seem to get on without difficulty. . . . I have seen a good many old friends, especially to-day, such as Whitaker, Clifton, Foster, Guthrie, and I have made some new acquaintances."

To his Wife.

BRISTOL, *30th August* 1875.

". . . I brought Mrs. Elliott over this morning to the economic section, where several ladies, Mrs. Grey, Miss Carpenter, Miss Becker, etc., were to hold forth. I have no objection myself to women speaking in public, but it makes a good deal of bother at present, perhaps by being unusual. If this passes over in time, I think there will be no reason why they should not.

". . . This morning Mrs. Elliott and I went to St. Mary's, Redcliffe, which I found to be a superb church inside and well worth seeing: yesterday I saw Bath Abbey Church very well, as, however, I think I told you yesterday.

"In the *Daily News* to-day I find the abstract of my sun-spot paper given in full as a 'singular paper,' but I do not think it much matters. I am thinking of going on with the subject and trying to get something out of it. . . . I spent most of the morning in Stewart's section of physics (which Stewart presides over), and entered into a little discussion."

To his Wife.

BRISTOL, 31*st August* 1875.

". . . I have been attending the economic section all day, half the day being occupied with a long discussion on trades unions, which was partly interesting and partly tedious. I made a rather long speech on the subject, and again this afternoon I spoke on the subject of competitive examinations.

"There is to be no economic section to-morrow, so I think I will spend most of the day in seeing something of Bristol and its manufactures, which I have hitherto been unable to do for the most part.

"I have booked myself for the excursion to Wells and Cheddar which was assigned to me, the Avebury one, I suppose, being previously full. This evening I shall attend the *soirée*—the first evening meeting I have been at. To-morrow evening I shall go for a short time to a glee concert, a ticket for which has been presented to me, and afterwards to the *soirée* at Clifton College.

"Your letter received this morning is satisfactory, so that I shall stay over Thursday, and hope to get home in good time on Friday."

In September 1875 *Money and the Mechanism of Exchange* was published as a volume of the International Scientific Series. Mr. Jevons in his preface thus describes the book: "In preparing this volume I have attempted to write a descriptive essay on the past and present monetary systems of the world, the materials employed to make money, the regulations under which the coins are struck and issued, the natural laws which govern their circulation, the several modes in which they may be replaced by the use of paper documents, and finally, the method in which the use of money is immensely economised by the cheque and clearing system now being extended and perfected."

To H. S. Foxwell, Esq.

36 PARSONAGE ROAD, WITHINGTON,
3d October 1875.

"I am glad you like some parts of my book on money. Even if I could have got more into the allotted space, I do not know that I could have ventured to touch the subjects you mention.

"Have you seen Crumps' *Theory of Stock Exchange Speculation?* It is not altogether a good book, being written altogether from a business point of view, but it contains some useful hints.

"I have often speculated on the lowness of interest on money at call, but presume that it arises from the large quantity seeking employment, and the fact that it cannot be safely employed at a higher charge. Consols would certainly not allow of a higher rate, for if the money be invested say for a fortnight, the interest would be only $\frac{3\frac{1}{4}}{26}$ or just $\frac{1}{8}$ per cent, which might any time be lost by a forced sale, not to speak of expenses. He who invests other people's money in consols, or indeed in most other funds, will, on the average, have to sell when the price is depressed. This subject was much discussed last session in connection with the National Debt Commissioners holding the funds of the savings banks, which is money at call."

To E. J. Broadfield, Esq.

WITHINGTON, *6th October* 1875.

". . . Whether wisely or not I declared war against Mill's crotchets some years ago now, simply because I know them to be untrue, and I shall have to fight it out. I have little or no doubt about success, if only health and opportunities favour me; but you will see that in such matters one labours under disadvantages in not living, like most of the political economists and literary men, in London. You can hardly fail to see the need of my being there. It is more easy to imagine than describe. Take only the case of the Political Economy Club, of which I was made an honorary member a year or two ago. This dines and debates once a month

privately, and includes every leading economist. Mill's opinions were all disseminated and discussed there many years ago, indeed he was a very prominent member. I have only been able to attend the club two or three times altogether; last May I opened one discussion, but it is clearly of great importance to have such an opportunity of discussing and urging my own opinions. There are several other societies, the Statistical, Social Science, Royal, etc., from which I am practically cut off.

"It is a very momentous change to me, and the necessity for deciding comes at a most inconvenient time, when I am occupied with other anxieties. The professorship in University College has now been left at my disposal practically for three months, which is a very civil thing of them to do; but you may now consider, I think, that I have finally decided to take it, and the only difficulty is in providing for the lectures at London during the present session.

"You will also see that my going to London is wholly unconnected with questions of salary at Owens College, though it is a serious matter giving up some hundreds a year, as I am going to do, at my time of life. However, I expect that the sacrifice need not be permanently a great one if I want the money."

On the 8th October 1875 his first child was born, a son, who was named Herbert Stanley after his father and uncle.

To his sister Lucy.

36 PARSONAGE ROAD, WITHINGTON,
9th November 1875.

"I daresay you will be glad to hear a few things from me, especially as I am able to say that Harriet and Herbert Stanley are getting on well. . . . It is wonderful what interest one feels in the little fellow, though he has not yet shown any consciousness of his relation to me, except to cry when I touch him. . . . I have just received a letter from University College, stating that the Council propose to elect me professor, so that it is really settled, though the final ratification cannot be made until 4th December. I do not begin my work in London until next session in October 1876, and for the present a temporary lecturer will be

appointed. I trust I shall never regret the important step I have taken. It involves a loss of something like £300 a year, though part of this may be made up by other appointments or gains in London."

To H. S. Foxwell, Esq.

36 PARSONAGE ROAD, WITHINGTON,
16*th November* 1875.

"I quite concur in the proposal about the Girton students, understanding, of course, that there is no objection on the part of the University. I have sent a new question to Mr. West to be substituted for that on banking.

"I do not think the 'so-called Ricardian theory,' etc., much matters one way or the other, but am quite willing it should be altered to 'Ricardian theory.' I cannot recollect whether it was one of my questions or not. Certainly I cannot see that Ricardo has the slightest claim to the theory, as it was quite as well stated by Malthus, if not by Anderson long before. I am beginning to think very strongly that the true line of economic science descends from Smith through Malthus to Senior, while another branch through Ricardo to Mill has put as much error into the science as they have truth."

To H. S. Foxwell, Esq.

36 PARSONAGE ROAD, WITHINGTON,
20*th November* 1875.

"I return the revises without alteration. The question about rent was not mine, but I cannot remember whether or not I inserted the 'so-called.' I think you might as well speak of La Place's theory of gravitation as of Ricardo's theory of rent or Airy's undulatory theory of sight.

"I was pleased to hear that it is definitely settled for you to lecture at London. It is not likely to do you any harm, but you must not be disgusted if you have not a very brilliant class. None of your predecessors, so far as I can learn, have ever been able to infuse much spirit into the class, but still the work must be done, and it is worth doing, and I suppose I shall do it after you for the rest of my life."

To the December number of the *Fortnightly Review* Mr. Jevons contributed an article on "The Post Office Telegraphs

and their Financial Results." He also wrote during the winter an article on Boole for the *Encyclopædia Britannica*, which appeared in vol. iv., and he was engaged in preparing his *Primer of Logic* for Macmillan's series of Science Primers.

To M. Luigi Bodio.

THE OWENS COLLEGE, MANCHESTER,
23*d December* 1875.

"Allow me to return you my sincere thanks for the copies of your statistical publications which I have duly received, including the admirable treatise on the 'Casse di Resparmio,' which I also received some time since. They will all be valuable and highly-esteemed additions to my library.

"I am much pleased to think that my book on *The Theory of Economy* is about to appear in Italian, and I cannot but be flattered by your remarks upon it.

"My address will be at Owens College, Manchester, until about August 1876, when I hope to remove to London, having been lately elected professor of political economy in the University College at London. I hope by this change to enjoy greater advantages and leisure for further economical studies.

"I beg you to accept the copies of pamphlets which I send by book post.

"Your treatise on savings banks seems to me a most admirable work, to which we have nothing corresponding in England. It gives data for comparing the providence and progress of nations nowhere else to be found. The differences shown to exist between North and South Italy are strangely marked, and seem to show that the regeneration of South Italy will be as difficult a task for the Italian Government as Ireland has been and is for the English Government."

On the evening of the 23d December Mr. Jevons went to Ludlow and spent several days with his sister Mrs. Hutton, whose only son, a most promising boy of thirteen, had just died from diphtheria.

On the 24th he wrote from Ludlow to his brother Tom:

". . . No one could know Grindal without becoming ex-

ceedingly fond of him. A sweeter disposition no one ever had, and his quaintness and humour were very attractive.

"I left Harriet and the baby well at home. He is just beginning to smile and take notice of his father a little, but the pleasure I feel in him only makes me the more sad to think of Lucy's loss. We are getting to a time of life when joys and sorrows are much mingled."

CHAPTER XI.

1876–1880.

To H. S. Foxwell, Esq.

WITHINGTON, *25th January* 1876.

"YOUR account of the political economy class at University College, London, is certainly very discouraging. I never expected much, but could not have supposed there could be so poor a class.

"Last session I had, in my day class of political economy here, twenty-four students, in addition to an evening class of forty-two, held by a lecturer. This year I have ten day students, and an evening class, held by myself, of fifty-four. I have also a fair class in logic and philosophy of about thirty, in addition to an evening class of logic held by a lecturer.

"I am very well pleased with the first number of *Mind*, on the whole, so far as I have read it. Patteson's is a vigorous article. Venn's is able and interesting, but he much needs to be undeceived about Mill's logic.

"I only heard of poor Mansel's death a week or so ago. I had never seen him, but regret his untimely end. Your news about Sidgwick is quite news to me, and I am glad to hear it. Though my acquaintance with him is quite recent, I have conceived a great respect for Sidgwick in every way."

To his brother Tom.

OWENS COLLEGE, *16th February* 1876.

"There is a great deal I ought to write to you, but I have more letter writing to do than I like. Your American friends are evidently reading my book on *Money*, as I get

long letters from different parts of the States and Canada requesting my perusal of pamphlets and books.

". . . I am glad to say that Herbert Stanley is growing very well, and is already an amusing little creature. He has not the beauty of your children, but there are great signs of intelligence and character. . . .

"My professorship in the college is now advertised, and a fair number of applications will probably be received. We have not yet taken any steps about a house, but I shall probably go to London at Easter for a week of house hunting.

"I have been thinking much about your visit, and planning a scheme of action. . . . I will write again soon. At present I am filling up a half-hour at college, waiting for a concert of chamber music."

To Professor Clifford.

WITHINGTON, *16th March* 1876.

"I am very much interested to hear that you have been preparing a paper on the 'Types of Compound Statements.' I was not before aware that the subject had attracted your attention. It is impossible for me to guess how you could make an application of the grouping to hyperelliptic functions, having no idea what the latter are, but I am sufficiently glad to gather from all you say that my types of statement with three classes are not only valid but of some interest.

"I shall, of course, be much pleased to communicate the paper to the Manchester Philosophical Society, and the honorary secretary, when I mentioned the matter, naturally jumped at it. The society is, however, in the habit of closing its proceedings rather early in the year, and the last meeting named on the card is 18th April, but the secretary (Professor Reynolds) said the paper would be in time by 1st May.

"I quite feel what a privilege it is to live in an age when three or four men care about compound statements. I was lately pleased to meet with a correspondent (Mr. J. C. Monro of Barnet), who seemed to care whether Boole's views of probabilities were right or wrong. Even De Morgan exhibited a certain vagueness and apathy on this point

when I tried to get his opinion many years ago. I look forward with great pleasure to my new life in London, and the new friends I may perhaps hope to make, but already I am beginning to feel the perplexities of house hunting, having been nearly on the point of taking a house at Hampstead."

In March Mr. Jevons read a paper to the Manchester Statistical Society "On the United Kingdom Alliance and its Prospects of Success." This paper brought a good deal of criticism upon him, and he was thought, by some of his friends, to be very bold in expressing his opinion "that the United Kingdom Alliance is the worst existing obstacle to Temperance Reform in the kingdom. It absorbs and expends the resources of the temperance army on a hopeless siege, and by proclaiming no quarter it drives the enemy into fierce opposition to a man." But the paper was the result of several years' reflection upon the subject, and he saw no cause for changing his opinion, that in trying to pass a Permissive Bill the Alliance aimed at too much, and so hindered all reform.

To Rev. John Venn.

WITHINGTON, *26th March* 1876.

"Thanks for telling Macmillan to send me a copy of your new edition, which shall have my very best attention, You admire Mill so much more than I do, that to a certain extent it makes us look from different points of view, but there is nothing like the free expression of opinion for getting towards the truth. There is no immediate prospect of a second edition of my *Principles* being required, but possibly in a year or two I may have an opportunity of correcting errors and omissions.

"I am greatly obliged to you for stating your objections to my remarks on Boole. I did not want to take up much space in that book with controversy, more especially as I had said what I had to say in my earlier essay, 'The Pure Logic,' of which I send you a copy. My logical notation stands or falls with the substantial accuracy of what I have said about exclusiveness of alternatives. The point is certainly a nice and debatable one, but fifteen years of consideration lead me to maintain what I have said. Doubtless

Boole can express whether the alternatives are exclusive or not,

$$x(1-y)+y(1-x) \qquad (\alpha),$$

or

$$xy+x(1-y)+y(1-x) \qquad (\beta);$$

and so can my notation equally well,

$$\begin{aligned} &A\beta \dashv a B \\ &AB \dashv A\beta \dashv a B; \end{aligned}$$

but the point is that his notation necessitates the expression, so that, as he himself told me in a short correspondence, the terms are uninterpretable unless upon this condition. Thus $x+y$ has no consistent meaning in his system except it be explained as (α) or (β). Until you decide which it is, it cannot be used. But one general result of my logical cogitations is that you always use terms subject to subsequent restrictions or explanations.

"I cannot see that I am wrong on p. 130. By 'a condition concerning the exclusive nature of alternatives,' I mean simply that terms, wherever joined by + in his system, must be held to be exclusive, since

$$\begin{aligned} x+y &= (xy+x(1-y)) \\ &\quad +(yx+y(1-x)) \\ &= 2xy +, \text{ etc.}, \end{aligned}$$

would be actually uninterpretable—in fact a contradiction in terms.

"In answer to your remark that my $X \dashv Y$ is a concession to the laxity of common language, I can only refer you to pp. 82-85 in the *Principles* as to the latter part of my *Pure Logic*, of which I send you a copy.

"It is not easy to establish my view, but I am convinced of its truth. The best proof, perhaps, is to be found in the extreme simplicity and generality of my notation compared with the intricate and almost incomprehensible system of Boole. I am quite convinced that Boole's forms, $\frac{1}{1}, \frac{0}{1}, \frac{1}{0}$ and $\frac{0}{0}$, have no real analogy to the similar mathematical expressions. In logic they merely indicate that a term agrees with, or is contradictory to, one or other, or both, or neither side of an equation. But they have nothing to do with the values 1, 0, ∞ and ?

"As regards the form $A=AB$, I say on p. 49 that in

Boole's logic expressions of the kind A = VB were *freely* used, but that I found indeterminate symbols only introduced complexity. I do not say that Boole *exclusively*, but only freely, used A = VB, that is, the form corresponding to $x = vy$. I am, of course, aware that he also used $x = xy$. My point in p. 49 is that the introduction of v or V at all is a mistake, and in no way an advantage. I think my remarks are correct, though very concise, but you should understand that in view of the extent of the book I felt obliged to restrict myself to a simple exposition of my own notation, avoiding all controversy.

"I am not sure whether you mean that my acknowledgments of dependence on Boole were not ample enough. I should be sorry if this were so, but you will find in the *Pure Logic* abundant recognition of the fact, and in my *Elementary Lessons*, which is the only one of my books widely read, the whole subject is put down under the heading of Boole's Logic. The fact is, that a friend well acquainted with the matter remonstrated with me for representing my notation as being that of Boole.

"If I ever come to a second edition of my *Principles* I shall be happy to amplify a little upon the points of agreement and difference with Boole.

"You will gather from the last chapter of the *Pure Logic* that I hold Boole's system to be absolutely perfect within itself, entirely self-consistent, but I deny that it is logic pure and simple.

"The relation to logic is one of so difficult a kind that I cannot say more than I have said in the *Pure Logic*.

"My machine is rather a large and awkward thing—about three feet high. There is only one in the world, and probably there never will be another. I would offer to send it, only it will not bear travelling, and I fear it would be useless to send it to you. I enclose a photograph and a paper giving full details of it. The abacus will do all that the machine can, and more, as it takes in five terms, but it is rather troublesome to use. If you like to show it to your students I shall be happy to send it with or without the black board, and you could return it to me after we are settled in London. It does the problems in

a very short time if you get the knack of moving the combinations."

In the Easter holidays Mr. Jevons spent ten days with his family at Grange on the coast of Morecambe Bay, and he then went on alone to Edinburgh to receive the honorary degree of LL.D., which the University of Edinburgh had conferred upon him. He was the guest of Dr. Hodgson at Bonaly.

To his Wife.

BONALY, COLINTON, N.B.,
20th April 1876.

"Bonaly is a charming place—I had no idea a professor could have so nice a place. . . . The ceremony went off very nicely on the whole. Professor Maclagan made a speech laudatory of each LL.D., and said of me that the *Principles of Science* had put me on the same platform with Whewell and Mill. The students received me pretty well, especially when he referred to the *Elementary Lessons*, at which they applauded, much to my amusement. Professor Masson gave a very good address upon the arrangements of education in Scotland."

"Hodgson says he is going to give up his professorship certainly; but I do not think Edinburgh would suit us, though Scotch professors have a nice position here."

To the May number of the *Fortnightly Review* Mr. Jevons contributed an article on "Cruelty to Animals, a Study in Sociology." In June he published his *Primer of Logic* as one of the series of Macmillan's Science Primers. It was designed as a guide to sound reasoning in the ordinary affairs of daily life for those who would not pursue the study of logic further, and as an introduction to the science for those who would pass on to the *Elementary Lessons in Logic.*

To R. O. Williams, Esq.

WITHINGTON,
MANCHESTER, *29th June* 1876.

"Thanks for your letter of 2d May. I am sorry I have not been able to reply to it sooner, having been obliged by considerations of health to give up all work as far as possible.

"I quite agree with you that symbolical statements are calculated to deter ordinary readers from proceeding further, but it is necessary that the mathematical nature of a science should be stated nevertheless.

"I contemplate undertaking, as soon as possible, a new work on political economy generally, in which a more broad and popular view of the theory will be given, and then I can, in any future edition of the *Theory*, give the symbolical and purely mathematical view more fully.

"I took the liberty of sending you a copy of my *Logic Primer* just published.

"I am going abroad to-morrow for a tour of some length."

The following day Mr. Jevons started for a tour in Norway, accompanied by his friend Professor Barker.

To his Wife.

LILLEHAMMER, *6th July* 1876.

"We have got so far quite well, and with delightful weather. We left Christiania by the afternoon train, very crowded and hot; but at Eidswold had a beautiful evening, with only a few people, and I had a good play on the piano. The next day the steamboat was very crowded with people returning from the timber fair, and the Lillehammer hotels were nearly full. . . . We hope to go on about the middle of the day, and in the meantime Barker and I are strolling up by the waterfall, Barker botanising vigorously. He evidently knows botany very accurately, in addition to his special knowledge of mosses, and is collecting any special Norsk plants. It suits me very well to loaf about with him and look for plants. Barker seems quite at home in Norway, and is rapidly picking up the language, which he often finds like Scotch. He will soon talk as well as I do.

"I have been a little troubled by my neck the last day or two, but feel well to-day, and hope to be very different in a week or two. Although very sorry to be away from you and the little one, I am quite sure it was the proper thing to do. Give the little fellow a kiss for me. It is a great pleasure to think of him, and he must be a great comfort and a good companion to you.

"There were two or three mosquitoes in the room last night, and I fear we shall have them in this fine warm weather; but we must push on to the Dovre. There is a young American, who amused me much, being utterly fresh, and reading out of Bennet's *Phrases*, of which there is a new and improved edition. I have had a good deal of conversation in English with an old gentleman named Tornon, who says he is the largest maker of the Norsk preserved meats which you know. It was a good idea to bring music, and I have played it nearly all through already. It sounded nicely in the large wooden room at Eidswold."

To his Wife.

DOMBAAS, DOVRE, 9*th July* 1876.

". . . We are getting on very comfortably and easily, and there is no fear of my overdoing myself. You will probably have received my letter from Listad, which I delivered to the postman with my own hands. Since then we have slept at Moen, a small station, which *we* missed by going off to Vaage and coming back by a different road. We got dinner at Toftemoen, and I saw both Tofte himself and his brother. It seems that Tofte lives up at a farm on the hillside, where he has a good house; but in the absence of his son he comes down now every day to look after the station. He was a stout old man—anything but a dignified descendant of Harald Haarfager. But I am rather glad to have seen him. There are said to be more travellers going along the road than were ever known before, but they are mostly Norsk, and we have met very few English travellers since leaving Lillehammer—only, indeed, one party of a clergyman and some ladies.

"We have had no difficulty about quarters, nevertheless, and have usually had the stations to ourselves. Here we are spending Sunday very comfortably, and Dombaas proves, as I expected it to be, a desirable resting-place.

"I feel immensely better for the few days' carioling we have had. I intend to be extremely prudent about over-exertion; and, in spite of my somewhat wretched state of nerves during the last few months, hope to be better than ever before returning."

To his Wife.

KONGSWOLD, *Sunday, 16th July* 1876.

"I have been lazy about writing lately, and cannot say much this morning, as 'Frökost' will soon be ready. We have got on very slowly, partly owing to my inclinations, partly to Barker's botanising expeditions. Since I telegraphed to you at Dombaas we have been on the plateau of the Dovre Fjeld, two days at Fogstuen—the first small station, one day at Jerkin, and nearly three days here. I have found this a very pleasant station, nice, pretty rooms, attentive 'pige,' a good-toned piano; and so between music, fishing, walks, and a drive yesterday down to Drivstuen, I have got on very well. Here I have only succeeded in catching one fish. The river looks a good one, but for some reason or other the fish will not rise. At Jerkin I had an afternoon's fishing, with some little success, getting seven trout. . .

"Jerkin is also a good station, but is far from being so nice as this. It is in a dreary, exposed position far from the river, whereas this is just at the top of Drivdal, sheltered among the hills, and in front of a pretty river. After some inquiry we have decided on changing our route, and giving up the round by Trondhjem. We have heard poor accounts of the scenery and accommodation on the road from Trondhjem to Molde; nor does there seem to be anything very beautiful between here and Trondhjem. I am, therefore, writing for any letters which may be there, and we go back to-day over the Dovre, and then down the Romsdal. . . .

"I think I am better in health than ever I was in Norway before. I sleep perfectly, and can do more without fatigue. What a pleasure it will be to get back to you and the little one."

To his Wife.

AAK, ROMSDALEN, *24th July* 1876.

"Since I last wrote to you on our arrival here, I have been very lazy, doing nothing but reading novels and sitting in a boat fishing. We have, as usual, found it rather difficult to leave Aak. Yesterday, with fine weather, it was very delightful, and the Englands, a young man Sidgwick, the

cousin of Henry Sidgwick, and a Scotchman, Mr. Milne, formerly an engineer in the Admiralty, make agreeable society.

"Yesterday Barker and Sidgwick clambered up the fjeld immediately behind the hotel, and Barker came down late in the evening with considerably increased respect for Norwegian mountains. He took my barometer, and found that the height was about 4000 feet. Most of the other mountains about, including the central one, are of similar height. The Romsdalhorn appears to be about 5000 feet, and the wild Vængetinderne, which lie behind, 1000 feet higher still.

"I have been out three times here to fish, but only caught fish the first time, namely, four river trout, of which one was about a pound in weight, and looked a beautiful fish. The salmon, unfortunately, have quite disappeared—perhaps because they have begun to net the river after Mr. Davenport's departure. . . .

"I was greatly pleased to hear of baby continuing well and lively. I long to see the little fellow again. I cannot think now how we did without a child. I hope you will keep visitors and the servants from playing with him, and exciting him too much. He cannot be better occupied than with amusing himself when he will do so. I like to see some of the little Norsk children, as they remind me of baby.

". . . I will write again to Tom soon; but it is too much like work to write often. The hardest work I have done of late is reading Trollope's *The Way we Live Now*. . . No doubt Trollope has written too much, and many inferior tales, but his power of lifelike invention is unrivalled, in my opinion."

To his Wife.

SÖHOLT, STOR FIORD,
Thursday, 27th July 1876.

"I was very glad to get two letters from you yesterday, when we arrived at this pretty place.

"In leaving Aak I carried out a wish I had felt to take the land and water route to Molde. We left Aak at 8 A.M., crossed from Veblungsnaes to Torvick, and then had a most

beautiful drive to Alfarnaes, on another branch of the Romsdal Fiord. We passed a lake surrounded with pine-covered hills, and with the Romsdal Mountains towering up in the background; this was one of the most excellent pieces of scenery I ever saw. There were two more short boat stages and two more land stages before reaching Molde. The last was a one Norsk mile drive along the north shore of the Romsdal Fiord, with a fine view of the mountains in the distance, and very pretty houses, trees, and fields in the foreground. Along this road a number of well-to-do Norwegians have built villas like those in the neighbourhood of Christiania, and it is difficult to imagine a more delightful position for them. We got to Molde about 7 P.M., and as the fiord seemed very smooth, I suggested to Barker that we should at once take a boat, have tea (and cocoa), and row over to Vestnaes, thus avoiding the chance of rough water next morning. But this was one of those suggestions which, whether wise or not originally, proved unlucky. Buck, who kept the hotel, and never sent our letters on, has retired into private life in his own hotel, having apparently made his fortune. Another hotel has been opened by a Madame Wilkens, of whom we had heard no favourable accounts. When we went to her, and asked for 'aftenspise,' and then a boat, she declined to let us have 'spise strax,' and said a boat could not be had under two hours. She evidently wanted to keep us for the night, or two nights, till the steamer started. We therefore walked out of her house. I went and got my meal from an old woman who had a coffee-stall on the pier, and then, after much trouble, succeeded in getting a boat, but not before nine o'clock. Madame Wilkens could readily have done everything in half an hour or an hour. We got to Vestnaes all right about midnight, having been sixteen hours travelling four land and four water stages. We got beds at the inn, which is now open at Vestnaes, and came on yesterday to Söholt.

"We go on by the steamboat at 10 A.M. on Saturday morning. It will take us up the Geiranger and back the same evening, and land us at Hellesylt, and we shall, if possible, go on the next day (Sunday) to Faleidet."

To his Wife.

HOTEL SCANDINAVI,
BERGEN, *5th August* 1876.

". . . We are in misfortune just at present, the weather being dreadfully bad. We have had rain almost constantly for a week, and much wind. At Faleidet we were obliged to give up the expedition to the glaciers, which I have long intended to make. Tonning station has unfortunately been given up, and a journey of sixteen hours in rain and wind was not to be thought of. For the same reason I thought it best to give up the overland journey to Vadheim, and we took the Nord Fiord steamboat direct to Bergen. On the whole, we were well pleased with our journey. A little way down the fiord above Sandene the scenery began to grow very fine, and at last we came in full view of one of the most extraordinary fosses I ever saw, called the Oxen-elven Foss, not mentioned in the books. It consisted of two great fosses and a number of small ones, and the larger ones were both divided into innumerable small falls from ledge to ledge of the rock, something like the Tvinde or one of the Laatefosse, but on a much larger scale. Owing to the rain these fosses happened to be very full of water, and presented a really wonderful sight, accompanied with a loud roaring noise as the steamer passed near them. The fosses were from 700 to 1000 feet high, though there was no single leap of more than perhaps 200 feet. Above the fosses were some gigantic mountains and rocks of very unusual form—one of them a great square mass with a precipitous side several thousand feet high. As the boat gradually steamed down a long broad reach of the fiord the view of these rocks and fosses was very fine, and quite unique in my experience. Excepting for the rain, we had an agreeable passage, as there were not more than about a dozen passengers at any time. . . . Bergen is the same as ever, except, indeed, that they have made a much-needed quay or pier just below this hotel, so that you can embark or disembark from the steamboats without small boats. I think that we shall go on to-morrow morning early by the Hardanger boat, and stay a few days at Odde, till the steamboat calls again.

". . . Although I hope I am slowly recovering from my

last breakdown, it is evident that for some time to come I must not work so hard again as I did last winter; and if I am to go on at all with my books for the present, I must be relieved of nearly all other work, in some way or other."

To his Wife.

ODDE, HARDANGER,
Friday, 11th August 1876.

"Our tour seems to draw rapidly to a close, and in leaving to-day at 1.30 P.M. by the steamboat for Eide, we may be said to begin our homeward journey. We want to get to Laerdal by Sunday, but it will be rather a hard push to get through, if there are many other travellers.

"We came from Bergen by the *Hardangeren*, and had a pleasant passage with fine weather, but too many passengers, as the *Argo* had just arrived from Hull. We went ashore for a few hours to sleep at Eide, in a new station inn close to the pier; then, without stopping for the Vöring Foss, we came on here, where we have spent four nights. I have been again to the glacier, which seems much increased, and is very beautiful and remarkable. The next day being fine, I drove up to Seljestad, as we did before, except that a capital new road is now made from Odde up to the Sandven Lake, and then along its left bank all the way to Hildal. I had a good horse and comfortable *kjærre*, and liked the trip well. I climbed up a rock just above Seljestad, and had a good view of the Folgefond. Barker went the same day with some other people to the Skjæggedal Foss, and came back after fifteen hours—there having been some ladies in the party—much pleased. I have been amusing myself here with fishing in the fiord near to the inn, and caught about eighteen whiting and another fish. Last evening I tried the river here, after paying one mark for the privilege, but met with only one little trout.

"By carefully avoiding any considerable exertion I keep pretty well, and I daresay I may feel still better after getting home."

LINDSTRÖM'S HOTEL, LAERDAL,
Sunday, 13th August 1876.

"Since writing the enclosed from Odde we have made a

rapid movement, and succeeded in travelling from Odde to Laerdal in thirty-two or thirty-three hours. We left by the steamboat at 1.30 P.M., reached Eide about 6 P.M., chanced upon horses returning to Ornseim, which we engaged to Vossevangen, and drove straight off, and in spite of a delay of half an hour at that wretched intermediate station, got to Vossevangen at 9.30 P.M. Fleischer is very flourishing and was quite full, but made us up beds in the sitting-room. There were thirty-one travellers in the house. At 8 A.M. on Saturday we went off with one horse for Gudvangen: beautiful fine sunny weather. On the way we struck up acquaintance with a young man from Oxford and his wife, travelling with 'tolk' and maid, and they asked us to go with them in a small steamer which they had specially ordered for their own convenience from Gudvangen to Laerdal, for no apparent reason. In this way we got to Laerdal before 10 P.M. last night. We had a fine drive to Gudvangen, with little or no delay in changing horses. At Vossevangen I was disappointed in finding no letters, though it had occurred to me that there was not enough time for you to answer since my telegram. Here I found your long and very pleasant letter. . . . I shall probably do nothing but play with baby when I get home.

"The sale of the *Logic Primer* is very satisfactory. I should doubt whether any publication on logic ever sold so rapidly before.

"To-morrow we go to Haeg, and then, with occasional stoppages, over the Fille Fjeld, and probably down the Spirellen Lake."

On the 1st September he wrote to his sister Lucy:—

". . . I got home on Monday evening. . . . My journey was on the whole very enjoyable, and I never got the least tired of Norway. I should like to tell you all about it, but the story would be too long. . . . The labour of moving and entering on a new life and work weighs very much upon me, but perhaps I shall take a brighter view of things in a little time. Everything at home here is most happy; Harriet seems remarkably well, the little fellow all life and fun."

To his sister Lucy.

21 WOBURN SQUARE, W.C.,
15th September 1876.

". . . You will be glad to hear that we have found and taken a house on a three years' agreement, with option to make it a lease for seven, fourteen, or twenty-one years.

"It is in many respects a charming house, semi-detached unfortunately, but that cannot be helped. . . . It is on the edge of the heath, quite high up, with glimpses of Windsor Castle and other distant views from the upper windows. A few yards from the door there is the full view from the heath. . . . In a sanitary point of view it seems to be perfect. Of course there are objections to it; the garden being very small, and the position rather inaccessible—six or eight minutes' walk from the Hampstead omnibuses, and almost half an hour from the trains. But I think it will suit us capitally, and be for us quite a *rus in urbe*. I could not sleep last night for thinking of it. More when I see you."

It was not without much regret that Mr. Jevons had resigned his position at Owens College. He had been on terms of warm friendship with his colleagues, and had much enjoyed the friendly social intercourse which had always been customary amongst the professors. Though he could not always coincide in opinion with them, there was never more than a friendly disagreement, as, for instance, when it was first desired to make Owens College into a university. Mr. Jevons was opposed to the idea, fearing that an increase in the number of universities would tend to lower the value of a degree. Even when he found that the scheme was supported by every one in the College except himself, he could not be shaken in his opinion; he would only go so far as to say that if there was to be a new university, it should not be Owens College alone, but a university comprised of Owens College and all the local colleges who wished, and were qualified by their teaching powers, to enter it—a plan closely corresponding to that which was ultimately adopted. He had a strong influence for good over his students, all the more perhaps because he was so unconscious of it. One of them has since written of him: "To

me and to many others Professor Jevons was the embodiment of all that was high and just." And another has written: "No one could help loving him; there were men in my year at college who would have thought it heaven to serve him. I was one of them. We found in him always much more than a teacher. I never knew a man that it did me more good to be in the presence of."

Of his method of teaching the same gentleman has written: "He was not content with merely delivering his lectures, but was careful to ascertain whether his students understood what he was aiming at. I never knew a professor more conscientious, more diligent, and more sympathetic. I owe a great deal to him. He taught us how to think all about and in and out of a subject."

He watched the future career of his students with much interest, and was always ready to give advice to those who sought it from him, or any other help that lay in his power, even when his own work pressed most heavily upon him; and he used to regret that his bad memory for faces, added to the change which a few years often caused in a young man's appearance, prevented him sometimes from recognising his former students if he accidentally met them, and thus made him appear less cordial than he really felt. But if they recalled their names to him, they always found that, though for the moment at a loss, he had not really forgotten them.

On the 2d October Mr. Jevons went to London to give the introductory lecture to his class on political economy; the subject he had chosen was "The Future of Political Economy." The lecture was afterwards printed in the *Fortnightly Review.*

He wrote to his wife from University College on 3d October:—

"I have managed to get through the lecture without any conspicuous failure. The attendance was poor, and there was no liveliness worth speaking of, and no other speeches, simply a lecture. The humorous attempts answered very well, except that about the dog's idea of property, which failed. I am glad the affair is over and not worse.

"I saw the house yesterday, and was charmed with its position again, and with most other things relating to it."

He returned to Manchester on the 5th, and in the middle of the following week he removed with his family to Hampstead.

Though Mr. Jevons left Owens College with regret, it was with much pleasure that he commenced his duties as professor at University College. He had always retained an affection for the place since his student days, and felt at home there at once. The duties of the professorship consisted of a course of lectures on political economy, beginning in October and ending at Easter; one lecture only was given each week, but during the first session Mr. Jevons gave two lectures a week.

Mr. Jevons had also this year been appointed examiner in logic to the University of London—an appointment which he held for five years. He began his duties this month.

His increased leisure was most welcome for his literary work, which seemed continually to grow upon him, as, in addition to new work, he had the preparation of second editions of the *Principles of Science* and the *Theory of Political Economy* in prospect. As soon as he was settled in London he began to prepare the second edition of the former, and it was published in 1877 in one volume, instead of two, that it might be more within the means of students who desired to use it as a text-book.

To E. J. Broadfield, Esq.

HAMPSTEAD, 19*th October* 1876.

"I was much concerned to see in the papers the announcement of the death of your father, of which I received further notice two or three days ago in the card which you kindly had sent. You must have known that you would be sure to have my warm sympathy in this loss. At his age it must of course have been looked for; but I can imagine that it is hardly less bitter when the separation actually comes. It is now more than twenty years since I lost my father, and thirty years since I lost my mother.

"I am sorry that I had not the opportunity of becoming better acquainted with your father. Knowing what his son is so well, I feel sure I must have found a great deal to

esteem in him. Please send me a copy of the portrait when it is ready.

"We are now living in our London house, which, I hope, may be our home for many years to come; but it is as yet in a state of the greatest confusion, as we have only just chairs to sit down on. The situation, overlooking Hampstead Heath, is, to my mind and eye, very quaint and charming. My study looks to the back on old trees and gardens, and is, so far, delightfully quiet. I am oppressed with things which I ought to do, and so will not say more at present."

To his sister Lucy.

UNIVERSITY OF LONDON,
BURLINGTON GARDENS, W.,
27th October 1876.

". . . Our house is still in a good deal of confusion, and I do not see how I can do much at it now for a week, as I have a large number, some 180 papers, to read for the B.A. examination, which is now going on. We continue to be pleased with our house in most respects. The heath is charming, and entices me out in a morning for a ramble in a way quite different from Withington.

. . . "My books are selling pretty well, 8000 copies of the *Logic Primer* in six months, and 3350 of the *Elementary Lessons* in the year. We shall probably have a new edition of the *Principles of Science* in the spring if I can prepare it."

On the 27th November he wrote to his sister:

. . . "I have come to the conclusion that my move to London was a very wise thing, as far as we can see. There is so much more to interest one here and keep one active, without overworking one's head. My health is now better than it has been probably for ten years back."

To John Mills, Esq.

2 THE CHESTNUTS,
HAMPSTEAD, *3d January* 1877.

"My paper on 'Sun Spots and the Price of Corn' has not been published, and in fact withdrawn, because I found, with subsequent calculations, that the same data would give

other periods of variation equally well. The method of averages adopted seems delusive in this case, and I hardly see any way of settling the matter conclusively. That the inquiry is far from being an absurd one is, however, shown by the remarkable fact since brought to view, that Sir William Herschel, at the beginning of the century, tried to explain the variations in the price of corn by the sun spots. I send you the MS. as it was read at the British Association and partially reported. Please, however, do not allude to it, except you add that I regard the conclusions as neither proved nor disproved.

"The organ has been quite successfully re-established, and seems to sound much better in this than in the former house. The tone comes out more and resounds about the house.

"I think we shall be charmed with Hampstead in the spring and summer; but the recent weather has not been such as to develop the pleasures of the heath.

". . . The summer holiday and comparative relief from college work have been very beneficial to me, and I am now in pretty good working order. I am just engaged upon a new edition of the *Principles of Science*, and also upon a *Political Economy Primer*, to serve as a companion to my *Logic Primer*. I have not heard any concerts yet to compare with Halle's as a whole; but I have been repeatedly to the St. James' Hall popular concerts, where the chamber music is delightful.

To his sister Lucy.

HAMPSTEAD, *15th January* 1877.

". . . A new edition of the *Principles* is coming out in a few months. It will probably cost only half as much as the first. I have been a good deal occupied in preparing it.

"Our little fellow seems quite well, but gets on slowly with his teeth. I often think what it would be to lose him. He has charming little ways of amusing himself and others. He calls me 'dada' now, when he hears me come in, and is making various attempts to speak. Jane whistled to him one day when he saw a bird, so now he makes a curious gurgling in his throat whenever he sees a bird."

To Professor Leon Walras.

HAMPSTEAD, 28*th February* 1877.

"I thank you much for sending me the copy of your four memoirs, which I have safely received. I am glad to see that you are proceeding with your inquiries, and have now found a theory of capitalisation. This appears to display all the originality and ingenuity which were so conspicuous in your previous memoirs. I am not myself much engaged at present upon political economy, being just now very busy in revising my book on the *Principles of Science* for a second edition, the first edition having been sold out. This work almost entirely prevents me from reading anything at present. After it is done I propose to complete my examination of John Stuart Mill's philosophy, in which I shall show that the logical value of Mill's writings has been much misunderstood, and that he is really a bad logician.

"I have the pleasure of sending you, by post, a copy of a small elementary work on *Logic for Schools*. Books of this sort are sold in large numbers in England and America. I am intending to prepare also an elementary book on political economy for Messrs. Macmillan. My introductory lecture, printed in the *Fortnightly Review*, is about to be republished as a translation into French by M. de Fortpertius, in the *Journal des Economistes* for March, where you will no doubt see it. This, at least, is what I am informed.

"Some weeks ago I took the opportunity of reading Dupuit's *Memoire de la Mesure de l'utilité des Travaux Publics, Annales des Ponts et Chaussées*, 1844, which I had not previously seen. It is impossible not to allow that Dupuit had a very profound comprehension of the subject, and anticipated us as regards the fundamental ideas of utility. But he did not work his subject out, and did not reach a theory of exchange. It is extraordinary, too, what a small effect his publication had upon economists, most of whom were ignorant of its existence.

"I hope that your health is now re-established, and that you are able to avoid excessive exertion. I am now comfortably situated at Hampstead, and having only few lectures

at University College or other occupations, am able to give my time to repose or to literary work, as seems fit.

"If you are ever coming to London, it would give me great pleasure to receive a visit from you here. If you have not been in England, there is something of interest here. I speak French *very badly*, but perhaps you speak English. In any case we would manage to discuss matters of common interest. At the end of June, however, I go to Norway, and may not return till the end of August."

To the April number of *Mind* Mr. Jevons contributed an article on "Cram," which was a defence of the system of competitive examinations, against those opponents who considered that examinations led only to cram.

At Easter he took a few days' holiday with his brother, visiting Canterbury for a second time, and then going on to Sandwich and Dover.

To George H. Darwin, Esq.

HAMPSTEAD, 30*th April* 1877.

"Thanks for your paper on the 'Nebular Hypothesis.' It is a very interesting and important one, and though you call it speculation, yet there is a basis of mathematical reasoning throughout, which makes it very different from ordinary speculation.

"I do not think Manns is at all conclusive against the theory, but the question evidently depends upon Mercury and Venus, which, if very oblique, lend much probability. I do not know whether your attention has been given to the curious difference between the planets referred to on p. 357, vol. ii. of my *Principles*, quoting from Chambers' *Astronomy*, 1st ed., p. 23. The marked differences between the exterior and interior group seem to show that there must have been some difference of origin.

"Would it be possible to account for the more rapid axial rotation of the outer planets by one nebula in a partial state of condensation encountering another of much less mass? Might not such a planetary nebula revolve for a time as a separate body, and only after a time be broken up into distinct planets with satellites? Can you approach, mathematically, the results of one nebula revolving round

another? There intervenes, however, the question whether a nebula is to be treated as gas, or as a swarm of meteoric stones; or possibly both at the same time."

During this spring Mr. Jevons was working at his *Primer of Political Economy*, which he was preparing for Macmillan's series of Science Primers; but the novelty of his life in London induced him also to go about more than he had done in Manchester, and more than he found himself able to do in subsequent years. During part of May his wife and little boy were absent from home. On the 13th May he wrote to his wife, after hearing a concert at the Albert Hall: "I had a pleasant day yesterday; the Wagner performance, in some parts, was very fine, and I believe he is a great musician. But much of the music is quite unsuited to so large a hall, and would require scenery to make it effective. The loud orchestral parts were magnificent." And again on the 18th: "Yesterday, after writing in the morning, I went to the Academy for an hour, then to dine with the University of London Club, and afterwards to the Royal Society, where I rather luckily heard Tyndall describe his long series of experiments on spontaneous generation, etc.

"I have now begun to write the finished copy of the *Primer*, and am getting on with it very easily. I do not know whether I can finish it all before going to Norway, as the examinations interfere and the paper I propose to write for America."

The paper for America which he refers to, was on the "Silver Question;" it was read at the American Social Science Association, and was afterwards published in the *Bankers' Magazine* for December of the same year.

To John Mills, Esq.

HAMPSTEAD, 30*th May* 1877.

"Can I trouble you to let me have back the MS. of my paper at the British Association, on 'Commercial Crises and Solar Spots?' I am working at the subject again, and am more convinced than ever that there is some connection; but it is a treacherous subject, and requires much care. I am not sure whether I have not found out the relation

between the sun spots and the price of corn; but at present it is little more than a surmise.

"I have been having a great feast of music lately, between Rubinstein, Wagner, and minor performances. Several hearings of Rubinstein quite confirm the first impression that I gathered when I heard him in Manchester some years ago, namely, that he is one of the most extraordinary performers who ever lived—perhaps the most extraordinary. He realises one's ideal of musical creation more than I ever thought possible. I heard the Sonata, Op. 111, a few days ago. Wagner also has given me some new sensations.

"We discuss the subject of periodic crises next Friday at the Political Economy Club."

As soon as the University of London examinations were over, Mr. Jevons went abroad for a tour with his brother, whom he joined at Hamburg, as Mr. T. E. Jevons had been staying with his family in the Tyrol.

To his Wife.

HÔTEL D'ANGLETERRE,
COPENHAGEN, *Tuesday, 3d July* 1877.

"It seems now a long time since I left England, and we have seen a great deal. So far, our tour has succeeded well in spite of an unfavourable beginning.

"We went by rail to Lübeck, and were interested by the quaint old town. Then at 4 P.M. we took the steamboat for Copenhagen, sleeping on board, and getting in about 7 A.M. We have been much pleased with Copenhagen, which is a most lively, interesting town. We have been about twice a day to the museums, and that of old northern antiquities is altogether excellent.

"Soon after breakfast on Saturday we went to find Falbe Hansen, but he was not at his office, and we only saw him later on for a few minutes. On Sunday morning he came with a friend, Herr Madson, and took us to Thorwaldsen's Museum and some other places, and then to dine at a place some miles down the coast. There was a little misadventure, as the Danes were so busy talking that they forgot to land at the right place, and the steamboat appeared to be making off for Sweden. However, a few miles farther on, it called

at another dining-place, and we had a good dinner with them, partly walking and partly driving home. It seems that on Sundays almost every one who can goes out to dine and amuse himself in the suburbs, where there are numberless cafés and hotels and music saloons. Every night, too, we have spent at Tivoli, which is a great pleasure-garden, something like that we visited at Gothenburg, but much larger. There are concerts with good music every evening, pantomimes, ballets, a great two-storied merry-go-round, many times as large as that at Hampstead, etc. etc. All the people of the town go there, and on Sunday night there were 10,000 or 15,000 there.

"As the time is short, we have decided to go to Sweden instead [of Norway], and our address will be the *Grand Hotel, Stockholm.*

". . . There is much I might tell you, but time is too short. I think it would have been a great mistake to take Tom on a hurried visit to Norway, and of course I shall like the novelty of Stockholm."

To his Wife.

JÖNKÖPING, LAKE WETTERN,
SWEDEN, *5th July* 1877.

"We have now got nearly half-way to Stockholm, but, not wishing to travel day and night, have stopped at this town for a day.

". . . I did not get your telegram until some forty hours after mine was sent, and it delayed us a day in Copenhagen, which was, however, a matter of no regret, as we were able to visit again the northern antiquities and spend our fourth night at Tivoli, where we had good music of Wagner and others, besides pantomimes, ballets, etc.

"We came from Copenhagen by Malmö and Lund and the usual railway route, the journey occupying twelve hours. Here we found a fine large hotel—in fact, a grand hotel—very clean and nicely kept in the Swedish style. . . .

"This town is celebrated for its manufactories of lucifer matches (Jönköping Tändstickor), paper, etc., and it is also a kind of internal port of some consequence. We are going by boat from here to-night at 11.30, by the lakes and canals,

to Stockholm, arriving after a journey of twenty hours. The lake is broad and the banks rise somewhat, but the scenery is not nearly so good even as Mjösen. This evening, after *table d'hôte* at four, we are going to a garden to drink our coffee to music. There is also a music-garden just under our windows at the hotel.

"I am remarkably well, and up to a good deal of exertion. I have given up all ideas of ill health, and drink coffee and live like other people. I need not say anything more about health, as it is becoming humbug. Tom seems much pleased with our lively travels, and I think it lucky that we gave up Norway. I sometimes regret the fiords and fjelde, but quite think it was best to come here instead."

To his Wife.

GRAND HOTEL, STOCKHOLM,
Tuesday, 10th July 1877.

"We have not cared for Stockholm quite as much as might have been expected. We hardly like it so much as Copenhagen, though so much more beautiful a town in position. The gallery of pictures is very poor on the whole, and the palace, though large, is not interesting. The museum is almost next door, but the best part, the Antiquarian Museum, was not open till to-day, when I had a good look at it for nearly three hours. This hotel is very large and fine, and our rooms are very comfortable, but we scarcely like the place so much as the Hôtel d'Angleterre at Copenhagen. They have a curious way of making every one pay for the meals on the spot, which perhaps is wise on the whole, though rather troublesome.

". . . I shall look forward very much to the time when I can bring you to these parts, of which we have hardly seen anything. The museums will admit of many visits, and there are many things we have not attempted to see.

"I am pleased to hear of the little fellow being so happy; I fear he will miss his playfellows when they go, but I must blow some bubbles for him.

"We are thinking of going to Upsala to-morrow for one or two nights, and then perhaps taking a steamer to the

island of Gothland, where the town of Wisby is said to be worth seeing."

To his Wife.

GRAND HOTEL, STOCKHOLM,
Friday, 13th July 1877.

"I am writing to-day to Gothenburg to take a berth for this day week, so that our journey is rapidly drawing to a close. I rather want to get home and see you again—in fact, I am a little homesick, and neither Tom nor I wish to prolong our journey. The Gothenburg boats are so much the best that I naturally prefer that route. . . .

". . . Our trip to Upsala answered well, though we did not find much to detain us. The architecture of the churches both there and at Gamla Upsala, two or three miles off, is very curious. We walked to Old Upsala, where are three large mounds said to be the graves of Odin, Thor, and Frey. At a cottage near by we had the pleasure of drinking real mead, which has been drunk there for centuries back. It was very sweet and tasted of honey, but nevertheless agreeable,—something between very good ginger beer and very sweet champagne. It is drunk out of a horn. We found the hotel at Upsala remarkably pleasant and cheap. We had two beautiful bedrooms looking on the old church. This Grand Hotel still fails to give us a pleasant impression."

To his Wife.

WITTS HOTEL, KALMAR,
SWEDEN, *15th July* 1877, 3 P.M.

"We arrived here an hour or two ago after an eventful visit to Wisby. I will tell you, when I get home, what a queer old place it is; anything but pleasant for a chance visitor, but very interesting. The walls of the town are nearly perfect, and a magnificent specimen of the fortifications of the twelfth century, probably larger and finer in some respects than those of Avignon which we saw. The churches also are very curious, being, with one exception, of the eleventh, twelfth, and thirteenth centuries, unaltered except by partial destruction. All the hotels in the town were 'staengt,' *i.e.* closed, with one wretched exception, and that was full. We slept out at a nice little house, and ate partly

at the hotel partly at the Pavilion, where, as usual in Sweden, a brass band was playing most of the day. We had nice steamboats and very smooth passages both to and from Wisby. We are going this afternoon to visit Kalmar Castle with a very strange old Englishman living in Sweden, whom we take to be the Wandering Jew.

"I have written to Gothenburg to take my passage for the 20th. We go to-morrow *en route* to Lund, in the south of Sweden, where there is a university and a cathedral."

To his Wife.

HADSHUSET HOTEL, WEXIÖ,
SWEDEN, *18th July* 1877.

"Since I wrote a few lines yesterday from Kalmar we have advanced one stage, and in an hour or two Tom and I must part at Alvestad Junction. . . .

"The old gentleman whom I described in my last as the Wandering Jew turned out a remarkable man, namely, Professor George Stephens, a well-known Englishman who settled in Copenhagen as Professor of English there. He is very much like Professor Blackie of Edinburgh, and during a walk at Kalmar and the journey thence he gave us his opinions on all kinds of subjects, and enlightened us much on Scandinavian topics."

Mr. T. E. Jevons returned to the Tyrol, and Mr. Jevons crossed from Gothenburg to Hull. About a month after his return a little daughter was born on the 26th August, who was named "Harriet Winefrid," her father thinking that the old-fashioned way of spelling the second name was the more correct form of it. In the latter part of September he was not well, and, needing a little change, he paid a week's visit to Lyndhurst, in the New Forest, where his sister, Mrs. Hutton, was staying. On the 27th September, the day after his return home, he wrote to his sister: "I got on well yesterday and had a pleasant time at Winchester, where I saw the old hall formerly in Winchester Castle, the Cathedral, and the Church of St. Cross again. They are all well worth seeing, besides other things in the town. . . . I liked my visit to Lyndhurst very much, so far as health would allow. Herbert seemed very pleased to see me last night;

he showed it very prettily, and I could see an improvement in him, especially in speaking, since I went away."

At the beginning of October his wife went, with the children, to pay a visit to her sister at Birkenhead. On the 4th Mr. Jevons wrote to her: "I have been rather busy attending the Librarians' Conference, last night from 7 to 10 P.M., and this morning from 10 to 1.30. It is interesting and amusing without being exciting. I do not think I shall be able to carry out any of the suggestions in my own library."

To his Wife.

HAMPSTEAD, *8th October* 1877.

"Thanks for your letter received this morning. I enclose Herbert's first letter. I daresay you can make him pretend to read it.

". . . I feel quite well again, and have begun a little bit of writing at the *Primer*. Last night I went to the evening service at the Church of St. Bartholomew the Great, Smithfield, which I remembered seeing some twenty-five years ago. It is an interesting old piece of Norman architecture, the only one left in London after the great fire. Afterwards I heard the concluding voluntary at St. Sepulchre's.

". . . I begin my class this afternoon."

On the 9th he wrote to his wife: "My class came off rather well yesterday. The room was nearly full of students, including a good many ladies—several from last year's class. If they all really join the class it will be a decidedly good one, but I cannot know at present. I gave a rather good lecture, although I felt much disinclined for it."

This autumn Mr. Jevons became one of the secretaries of the Statistical Society, and a member of the council. He took much interest in the work of the Society, and attended the meetings as frequently as possible.

It will be remembered that in 1868 Mr. Jevons had prepared three articles criticising various points in Mill's *System of Logic*. As the articles were declined by the magazine to which he offered them, he had no opportunity of making use of them before Mr. Mill's unexpected death took place. Mr. Jevons much regretted this; he would rather have pub-

lished them during Mr. Mill's lifetime, but as that had not been done, he felt that he must keep them back for some time. Meanwhile his conviction that there were many errors and inconsistencies in various parts of Mr. Mill's writings deepened with continued study, and he determined to prepare a volume as *A Criticism of Mill's Philosophy*.

He had made some progress with it by this date, but having so much other work in hand, he felt that the publication would be delayed for some time longer, and he therefore readily accepted Mr. Strahan's invitation to publish portions of the book as articles in the *Contemporary Review*. The first appeared in December of this year.

To his brother Tom.

HAMPSTEAD, 16*th December* 1877.

"Excuse economy of paper; I never waste a sheet.

"I was pleased to get your letter last night, and this being Sunday evening (my letter-writing time), I answer at once.

"Have you seen the *Contemporary Review*, with my first attack on Mill? I am this evening finishing the proofs of the second article, which will be stronger in evidence, though rather stiffer. It is a good thing bringing them out at intervals in a magazine and then republishing them. I am determined to go through with the matter, and upset Mill's logic altogether.

"I have not been going much to amusements of late, but took a holiday on Friday to visit the Cattle Show and Temple Bar before it is pulled down.

"Rather more than a week ago I had an interesting night at the Political Economy Club, where I happened to sit next to an empty chair, and presently Gladstone came in and sat down next me. I reminded him of my name, when he at once talked about the *Principles;* and all through dinner, for some two hours, I had a long discussion with him, partly about Owens College, concerning which he made minute inquiries, but principally about legislative matters. He seemed desirous to discuss vaccination, and I am sorry to say he sticks to his idea that its value is not sufficiently proved to warrant making it compulsory. At any rate he

considers the matter open to doubt. He argued that the vaccinators have changed their ground, and now think re-vaccination needful; and on my saying I would agree to compulsory revaccination if necessary, he held that that would be absurd, and reduced the thing to an absurdity. When I mentioned his speech at the Adam Smith Centennial, when he spoke against extending government, he rather gave in to some slight objections I made, and he would not object at all to compulsory vaccination if there were no doubt of its efficacy.

"I was naturally much interested in an opportunity of judging of the style of reasoning of such a man as Gladstone in discussion. He was awfully wideawake, and picked you up quickly enough if you made the least slip, but I always regret that he had not a more scientific education.

"Lord Granville was just opposite, and Lowe not far off, but I did not speak to them. Mundella opened the debate on the causes of depression of trade, and made some rather pointed references to the *Coal Question*, which he seems to admire. The discussion turned chiefly to trades' unions, but I did not say anything. By the by, Gladstone spoke of a tax on coal, and was quite clear that if there were any such it should be on *all* coal raised, not merely exports, but he would no doubt oppose any tax at all."

To Herr W. Vissering.

HAMPSTEAD, *8th February* 1878.

"I have sent you, by book post, a copy of the *Journal of the London Statistical Society* for December 1877, at p. 664 of which you will find a brief notice of your important book on 'Chinese Currency.' As this journal is in the possession of all the leading statisticians and economists, and is carefully indexed, it will, I hope, make your work somewhat known, as it deserves. I hope to have other occasions of bringing your valuable inquiries under the notice of English readers, though I am not just at present engaged in any writing in which it could be fitly done.

"It has occurred to me to ask whether you could render me assistance in an inquiry of much importance, regarding the periodical recurrence of monetary crises during the eighteenth

century. I find that considerable crises occurred in England in the years 1763, 1772, 1782 or 1783, and 1793, and I have discovered some indications of a crisis in 1753. These crises were simultaneous with like events in Holland, and it is of course Holland which was the leading commercial nation at the time. Now, in regard to the theory of crises, it becomes most important to ascertain whether there were in Holland, in or about the years 1731-32 and 1741-42, any events at all corresponding to commercial crises or difficulties. This is the more interesting inasmuch as the great bubble of the South Sea Company occurred in the year 1720, so that I am not without hope of showing that from 1720 to the present time there has been a constant tendency to the periodical recurrence of these events.

"Being unacquainted with the history of commercial affairs in Holland at the time, and being unable also to read Dutch, I feel great difficulty in pursuing the inquiry. If, however, you or M. d'Aulnis de Bourouill could point out to me any information on the subject, or indicate the works in which it might be found, you would render me the most important assistance.

"Please give my sincere compliments to M. d'Aulnis de Bourouill when you have an opportunity.

"*P.S.*—I write at a time of intense political anxiety. As you will learn from the newspapers, the House of Commons, this morning at 1 A.M., passed a vote of £6,000,000 for war purposes, after an excited debate of remarkable character. If the Russians should really occupy Constantinople the war party here will have it all their own way, and it is impossible to foresee the results. There is an uneasy feeling in England that we may be on the brink of a great, in fact a European, war.

"I am entirely opposed to the war party here; but there can be no doubt that if once involved in war there would be no difference of opinion as to the necessity of carrying it to a successful conclusion.

"If Russia and Germany are determined upon aggression, then England will have to fight, as she has fought before.

"We may have made many mistakes in diplomacy in

past years, but it has been done in the sincere love of peace. There is a horror in most people here of spending blood or money in the defence of Turkey, or in a wretched conflict like that in the Crimea, but of course Russia cannot be allowed to paralyse Europe as she has paralysed so large a part of Asia. I do not believe in the civilisation of Russia. It is a barbarous system of despotism, and it is surely inconsistent with the interests of humanity that such a Power should be permitted to extend herself much farther."

To John Mills, Esq.

HAMPSTEAD, 11*th February* 1878.

"In a few weeks my *Political Economy Primer* will be out. I give a long chapter to Credit Cycles, which it occurs to me you may like to see before it is printed off. I therefore send proof by book post. In a day or two the first proofs will have to be returned.

"I thought it a good opportunity to disseminate your and my various ideas on the subject. The nature of the book does not admit of particular reference or discussion, but I hope you do not object to my introducing your name in a way which does not make you responsible for the statements. If you have any remarks to make, they would be much valued if received in a day or two. I hope that the *Primer* will have a large circulation, say fifteen or twenty thousand copies a year. I have now and then been going into the past history of crises with care, and am becoming more and more confident about the ten years' period. The matter is one difficult to establish from the paucity of information, but I believe I can detect an almost unbroken series of expansions of credit *pressures* or crises at approximate ten years' intervals since the South Sea Bubble of 1720, if not before. The physicists now reduce the sun-spot period to 10·23 years, so that the coincidence is as close as could be desired."

To John Mills, Esq.

HAMPSTEAD, 14*th February* 1878.

"Thanks for your letters, also for the proofs and pamphlet. The latter seems very interesting as regards the letters of

Gibbs, because he lets one a little into the arcana of the bank parlours. . . . I am quite aware that you insisted on the recurrence of these panics in spite of all kinds of casual incidents of the currency, etc. When I write more at freedom in the matter I shall bring it out clearly.

"What I want to do now is to prove the matter empirically, by actual history of last century occurrences. Formerly I thought, judging from various statistics, that the interval 1720-63 was a blank; but it is not so. I have now got an important link in the year 1732, when there was a bubble, or at least what they called *stock-jobbing*. It was so bad that an Act to prevent its recurrence, if possible, was passed in 1734; and a contemporary writer compared the bubble with that of 1720, no doubt an exaggeration, but a significant one.

"My impression is that the collapse of 1720 was premature, like that of 1873, and that about 1722 was the due time.

"My evidence concerning 1742 is yet very slight, as also 1753, but I hope to find plenty of evidence in a little time.

"1763 was a great crisis, as you no doubt know, and 1772, 1782, and 1793 were very distinct events."

To Professor J. d'Aulnis de Bourouill.

HAMPSTEAD, 18*th February* 1878.

"I am very much pleased to hear of your appointment by the King as Professor of Political Economy at the University of Utrecht. I feel sure that the choice is a wise one, and that you are determined to advance the science of which you have made a study to so good a purpose. It will always give me great pleasure to hear of your success, and I hope that we may have, in due time, various economical works from your hand.

"Since I wrote to M. Vissering I have been engaged in following out the inquiry I mentioned to him, as regards recurrent commercial excitement, periods of activity, and depression of trade during the eighteenth century. The information is very scanty, and I cannot make more than surmises at present, but I am inclined to believe that there

were *small or great* crises in or about the years 1701, 1711, 1720, 1732, 1743, 1753, 1763, 1772, 1782, 1793, 1805, 1815, 1825, 1836, 1847, 1857, and 1866. The periodicity is remarkable, and the average length of the period is somewhere about 10·3 years, so nearly the same as the sun-spot period—which is variously estimated at 10·45 or 10·23 years—that there can hardly be a doubt about the connection of cause and effect.

"About most of the crises there can be no doubt, but the earlier ones underlined are doubtful, and I am eagerly seeking information.

"If they could be shown to extend to Holland, the fact would be most interesting."

To John Mills, Esq.

HAMPSTEAD, 20*th February* 1878.

"I now return the correspondence to Northwold. I have read Gibbs' letters with much interest. . . . No doubt a judicious raising of the bank rate in good time would do much to mitigate panics; but it would be requisite that bankers generally should learn to look ahead. Even the bank directors are now beginning to allow that there are tides in their accounts—a fact which Langton so clearly put twenty years ago. It is only quite recently, I believe, that the idea has been recognised in the bank, and I believe we may look for a more intelligent treatment of such matters in future. Gibbs is, I suppose, one of the best.

"I find it exceedingly difficult to procure information about the state of trade in the early part of last century; but I am gradually getting slight indications. The price of copper seems likely to be the best indication of the condition of credit, just as the price of iron is now the most subject to variation. I suspect that the periods of collapse are about as follows:—1711, 1720, 1732, 1743, 1753, 1763, 1772, 1782, 1793, 1805, 1815, 1825, 1836, 1847, 1857, 1866, 1873-77. The average interval is about 10·3 years. The sun-spot period is variously estimated, but either 10·23 or 10·45 seems the favourite number now. You see that the South Sea Bubble was one of the series, but it broke somewhat prematurely."

To Herr W. Vissering.

HAMPSTEAD, 3*d March* 1878.

"I cannot enough thank you for your kindness in procuring the work on the Amsterdam Exchange, as also the pamphlet on the crisis of 1720. They contain exactly the kind of information which I need; and I expect to derive guidance from them, though I do not know Dutch. My English, joined to a slight knowledge of German and a few words of Danish, enable me to read a sentence here and there, and I have procured a dictionary to assist me.

"The references are invaluable. I do not yet despair of finding some distinct information about depressions of trade intervening between 1721 and 1763, so as to complete the decennial series. In London there was said to be stock-jobbing in 1732 comparable with that of 1720, though this is obviously an exaggeration.

"I am interested to perceive that the pamphlet on 1721 is by your father, so that by good fortune I have the assistance of those perhaps the best qualified in any country to inform me.

"I am interested in your remarks on the Chinese labour, and should like to discuss it with you, if you happen to visit London. It is too important and difficult a question to be answered in a few words.

"We have a large Chinese library at University College, some 10,000 tracts collected by the Rev. Robert Morrison. I suppose nobody ever looks at them. Indeed, in the close neighbourhood of the British Museum it is of little use.

"I shall have the pleasure of sending you a copy of my new little book on *Political Economy*."

To John Mills, Esq.

HAMPSTEAD, 24*th March* 1878.

"The evidence of bubbles and crises in the eighteenth century is apparently of a slight and fragmentary character, but when put together will have much circumstantial strength. I have nothing but fragmentary notes as yet, and much searching will be necessary.

"Only an hour or two ago I got valuable indications

of the earliest bubble yet connected with the stories from Mr. Cornelius Walford, being the number of insurance companies started in the undermentioned years :—

1704 . . .	2	1712 . . .	20
1706 . . .	2	1714 . . .	6
1707 . . .	1	1715 . . .	1
1708 . . .	2	1716 . . .	2
1709 . . .	8	1717 . . .	4
1710 . . .	37	1719 . . .	6
1711 . . .	35	1720 . . .	52

This is very important, as it clearly puts the South Sea Bubble in the series, and puts one before it which I had previously suspected.

"Then there was a bubble in 1732 which, in the *Gentleman's Magazine*, is compared to that of 1720 (or rather 1721).

"In 1743 there was a general and great rise in the price of wool, attributed to stock-jobbing.

"In 1753-54 there was a foreign drain and great scarcity of money; but I must search for more information. In 1763 there was a well-known Continental crisis, as also in 1773. About 1782 I have not much evidence yet; but 1792-93 was a great collapse, as you know. The difficulty of finding reliable information is very great."

In March the *Primer of Political Economy* was published. Mr. Jevons' long experience in teaching the class of pupil teachers in Owens College had peculiarly fitted him for the task of explaining clearly and simply those parts of Political Economy which can be taught to young people. At the same time, he "hoped that this little treatise may also serve as a stepping-stone to a knowledge of the science among readers of a maturer age who have hitherto neglected the study of political economy." No one, judging from the size of the book, could be aware of the time and labour that it cost him to prepare it. He was most anxious to make the best possible use of the limited space at his command.

To the Rev. Harold Rylett.

HAMPSTEAD, *24th March* 1878.

"I thank you very warmly for writing out so much of

my lectures and sending them to me. It is interesting to read what purports to be a verbatim report, but which has, I fear, undergone some improvement in the process. It is well known how much of the oratory we read is due to the reporters.

"As regards Shaw Lefevre's address, I cannot understand so large a reduction of cattle and sheep, because there has been no fall in price of meat or other cause to make the holding less profitable; and rise in wages of labourers would not much affect stock-farming. Decrease of corn-land is easy to understand. . . .

"I fear the transcription of the whole of the lectures will be a very long and tedious work, which I cannot venture to ask of you.

"Excuse my delay in answering your letter; but I have had a good deal to do, and cannot work long at a time, so that when pressed I have to leave letters for a time.

"I have been busy about the bringing out of the *Primer*, of which I think I sent you a copy."

To W. H. Brewer, Esq., H.M. Inspector of Schools.

2 THE CHESTNUTS, HAMPSTEAD,
24th March 1878.

"I have now actually got a second edition of my *Theory of Political Economy* in hand, and want to have it out next October, few copies now remaining. In addition to a general revision, I wish to add a bibliography of books relating to the mathematical treatment of political economy. I have your letter, written some years since, in reference to certain books, and shall find the trouble you then took valuable for my object. But it would greatly oblige me if you would just look over the books again at your leisure; and, after carefully writing down the title of each bibliographically, add a few remarks as to the contents and value, the note to vary from a single line to a page or two, according to your caprice or your estimate of the value of the book.

"I suppose Macmillan has sent you a copy of my *Primer*, with the disinterested idea that you would immediately use your tyrannical powers to force it on the wretched pedagogues who tremble at your approach.

"Seriously speaking, would there be any way of bringing the need of elementary teaching of political economy forward again? or would it not be better to leave Dr. Watts and others to do that? Some people do not believe in primary teaching of political economy. . . . No one is more likely to judge well than yourself. What do you think? I feel both the great need and the difficulty, and have not committed myself to any strong opinion in the preface, but rather quoted the opinions of the authorities."

To W. H. Brewer, Esq.

2 THE CHESTNUTS, 3*d April* 1878.

"I now enclose your former letters, which contain many notes, but it would be a great convenience for me to have a brief account of each of the books you have in your possession. I enclose a paper which shows the form of entry in my bibliography. The subject grows upon me as I proceed. There are more books than you would suppose, and I find that the Memoirs of Dupuit in the *Annales des Ponts et Chausées* are most luminous and valuable. Though he chiefly applied his ideas to the tolls, bridges, etc., he had a perfectly correct notion of the theory of value. It is curious how such writings come to be forgotten."

In the April number of the *Contemporary Review*, the second article, "John Stuart Mill's Philosophy Tested," was published. During the year of his residence at Hampstead Mr. Jevons had renewed his experiments on microscopic particles; and in the April number of the *Quarterly Journal of Science* he published an article "On the Movement of Microscopic Particles suspended in Liquid," which he had written early in 1877.

To E. J. Broadfield, Esq.

HAMPSTEAD, 7*th April* 1878.

"I was very sorry to hear from your last letter that you have so soon again had to bear another loss, and one less to be looked for. Sometimes I think that I am wanting in the imagination which alone can enable us to enter into other people's feelings—so far, perhaps, but only so far I may not feel with you so acutely as I should do. If

indeed for your sorrows to remind me of my own is sympathy, then no one could feel more. . . . Not long since, too, I lost a brother in New Zealand, who died suddenly and all alone of another hopeless disease, under peculiarly touching circumstances. If any one has had cause to doubt the benevolent government of human affairs, it is I and my brothers and sisters; and yet nothing can eradicate from my mind the belief that there must be a brighter side to things, and that we do not see all. It may be very unscientific, and 'exact thinkers' like Mill may have proved the opposite. In that case I must consent to remain among the unscientific.

"But to come to business. I should like to spend a night with you at Prestwich. I could go next Monday and be with you some time in the evening, if you should be disengaged and not disinclined for a *perfectly quiet* visit. I should probably go first to Birkenhead. Please let me know exactly what you wish. I might put off my visit for a week, or even till after Easter; but I should like nothing better than to have a few hours' talk with you when I do go.

"I am much pleased with your few remarks on the Mill article. Some people seem to think that I am doing myself much harm by the articles; and I almost suspect some of them to mean that I have no straightforward purpose in writing as I do in the *Contemporary*. But the fact is my attack on Mill is as much a matter of the heart as the head; and I feel sure that, if I can succeed in convincing people of the groundless character of much of Mill's writings, the service to truth must be of an important character. Moreover, it is one so difficult to accomplish that I was warranted in accepting Strahan's offer, to insert some articles in the *Contemporary Review*. I do not always like the company I am in there; and yet, on the whole, their company is more congenial than that of the Comtists who reign in the *Fortnightly*. Mallock's article is an extraordinary production.

"I have three or four books of different sorts on hand, especially a new edition of the *Theory of Political Economy*, and I have worked myself a little below par, perhaps more than a little, so that a few days' rest will do me good."

Mr. Jevons had been working very hard during the spring, and he now felt the effects of it on his health; he

therefore determined to take a few weeks' holiday on the continent in May and June, returning home in time for his duties as examiner. His cousin, Mr. W. E. Jevons, was his companion.

Of his visit to Aix-la-Chapelle he wrote to his wife:—

"I am glad to have seen the cathedral there, the older octagonal part of which was built by Charlemagne about the year 800. It is somewhat on the model of St. Vitalis at Ravenna, and I was pleased to be reminded of our stay there. It contains a number of beautiful columns of marble and granite, some of which were brought from Rome and Ravenna. The choir, too, is very beautiful, like the Sainte Chapelle at Paris."

And of Cologne:—

"Although I had seen it before, the cathedral surprised me by its beauty and splendour; and I think it is almost the *ne plus ultra* of Gothic architecture. The outside has been greatly restored, and the spires are getting on towards completion, though they must take some years yet. We visited a number of other churches, most of which were fine Romanesque specimens."

From Lucerne he wrote:

"Our time on the Rhine was a bright jolly time, and I seldom enjoyed travelling more than between Aix and Baden.

". . . We had a most beautiful journey from Baden to Constance, through the heart of the Black Forest, by a line quite recently finished, which winds about among the valleys of the Black Forest in an extraordinary manner, rising 2000 feet, reminding me of the railway through the Apennines. The views were often lovely, and we could also see the inhabitants, with their large quaint houses with overhanging roofs."

The weather was so bad that they could do little in Switzerland. He was much amused at going up the Rigi by railway. Afterwards they went on to Brienz and Interlaken, and then began their homeward journey.

He returned home to a solitary house. His wife, with the children, had been spending the time of his absence with her sisters; and she had not gone back because some

of the children in the adjoining house at Hampstead had an attack of diphtheria. He could not join his family until the University of London examination was over, and he felt the enforced absence from his children very much; for as their intelligence began to develop they were an ever-increasing source of pleasure to him. He ended a note to his wife with these words—"When *shall* I see Boy again. Give them both a kiss for me."

To his brother Tom.

MANOR HOUSE, EASTBOURNE,
21st August 1878.

"When your last letter arrived, I had just written to you, and our letters crossed. Another letter is now, however, due, and I write after spending a very pleasant week in comfortable quarters at Mr. Russell Scott's country house at Eastbourne. It has suited us all very well, the boy being newly introduced to the beach with spade and bucket, and instructed in wading and paddling by myself. Harriet always enjoys the sea, and we have had some pleasant drives to Beachy Head, Pevensey Castle, etc.

"After some ten days at home, we go for three weeks in September, to Derbyshire, where we have taken lodgings near Matlock, at a breezy farmhouse called Castle Top Farm, near Cromford. The hot weather which we have had lately has not agreed with me, and I have made up my mind to spend my summers in Norway as much as possible.

"I did not feel well enough to go to the British Association at Dublin, but I sent a paper on the periodic recurrence of commercial crises, and their connection with the sun-spot period. I do not know what they will do with it. Within the last few days I have had rather a disagreeable incident in the discovery, by Adamson of Owens College, of an unknown German book, by a man called Gossen, containing a theory of political economy apparently much like mine. There are, in fact, a whole series of books, hitherto quite unknown, even on the Continent, in which the principal ideas of my theory have been foreshadowed. I am, therefore, in the unfortunate position that the greater number of people think the theory nonsense, and do not understand

it, and the rest discover that it is not new. I am getting on but slowly with the new edition, and altogether am rather at a standstill."

The full title of the paper sent to section F of the British Association was "The Periodicity of Commercial Crises and their Physical Explanation." As will be seen from many of his letters, Mr. Jevons had given much attention to the subject during this year, and each fresh confirmation of his theory was a source of great gratification to him.

When he was preparing the second diagram for his paper, which gave the annual value of exports, from England to India, from 1710 to 1810, in three year averages proportionally represented, his wife can never forget how eagerly he called her to the study, that she might see how strongly the decimal variation was marked in most parts of the curve.

To John Mills, Esq.

2 THE CHESTNUTS, WEST HEATH,
HAMPSTEAD, N.W., *30th August* 1878.

"Are we to have a crisis and collapse next October or not?

"Accounts which are sent me show a large increase of bankruptcies in the first half of '78 compared with '77, and the recent unexpected pressure in the money market is very curious, and might seem to foreshadow a greater pressure in October and November; in fact I think there must be such.

"But, on the other hand, the occurrence of such numerous bankruptcies is what *often follows* a collapse, so that the real crisis might be placed in the autumn of 1877. The sun-spot theory, on the other hand, would lead me to expect the collapse in 1878. My paper on the subject was, as you perhaps heard, read at the British Association at Dublin, but it has not yet been printed in full. I contemplate writing further on the subject soon."

To H. S. Foxwell, Esq.

2 THE CHESTNUTS, *1st September* 1878.

"Thanks for your suggestion about De Quincey's book, which I will look into. I always thought it was not worth reading, but I daresay it was from a groundless prejudice against the writer.

"A remarkable book has been discovered by Adamson. It is by Gossen of Brunswick, published in 1854, and in a remarkable manner anticipates the principal results of Walras and me. No one seems ever to have heard of the book, and, not reading German, I was of course quite ignorant of its existence. The theory in question has in fact been independently discovered three or four times over, and must be true."

To E. J. Broadfield, Esq.

CASTLE TOP, CROMFORD,
DERBYSHIRE, *5th September* 1878.

"We are now just settled in this quiet spot, and one of our first thoughts is, when will you come? We expect to stay till the 21st, and shall be happy if you will come at the time best suiting yourself. I am writing an article on English Public Amusements for the *Contemporary*, and shall probably send it off at the end of next week. If you could read and criticise it, your corrections would be of the utmost value; but you must, of course, not inconvenience yourself on that or any other account. I have got the main substance of it ready now, so that we could discuss it at any time in the next week.

"We like Castle Top and the people very much, but are not at present favoured with the best weather. It is too dull and dark and damp to render life very spirited up here, but it is a capital place for a little quiet work.

"The children are very well, and Herbert is delighted with the trains, which he watches with ever-renewed interest. The Cromford railway also receives his attention, and yesterday he gravely informed his mamma, 'The train goes up with a rope. It is a very old line.' This is information I had given him shortly before."

To Professor Léon Walras.

HAMPSTEAD, *20th September* 1878.

"I shall pay careful attention to your remarks on my list of works on political economy. If I mention those which use only the geometrical method, I must be careful to point out the difference. I am sorry that my want of knowledge of German will prevent me from properly treating the German

economists. I am now informed that there is an almost unknown work by Hermann Heinrich Gossen, published at Braunschweig in 1854, which to a great extent anticipates my theory. Of this work, however, a friend promises me an abstract for my new edition."

At the beginning of October he attended the meeting of the Library Association at Oxford.

To his Wife.

CLARENDON HOTEL,
OXFORD, *2d October* 1878.

". . . We are having a pleasant meeting on the whole, and I find some friends among the librarians. . . . Mr. Coxe, the Bodleian librarian, is a very pleasant old man, and we had rather a good meeting last night, after the dinner. At the Rector's dinner I sat next to Professor Max Müller, whom I was glad to get acquainted with. To-night I am to dine with Professor Rolleston. I think, when I get home, I will begin to consider the question of a catalogue of my books. If we had cards printed, I think you could gradually get on with it, and ultimately there would be great use in it.

"Oxford decidedly surpasses Cambridge in the number and beauty of the colleges. The new buildings, too, in some cases are very fine, especially Waterhouse's Balliol College, which I admired very much before knowing what it was. . . .

"I shall make a point of being at Paris on the night of the 4th.

"Does the 'boy' miss me?"

To his Wife.

OXFORD, *3d October* 1878.

"We had a decidedly pleasant day here yesterday, the members of the Association becoming better acquainted with each other, as far as I am concerned. We had a very lively dinner at Professor Rolleston's, both he and Rogers, who took the other end of the table, being good hosts. The *soirée* afterwards in the museum was also pleasing, owing to the beauty of the building, which, however, was only very partially lighted up. In the afternoon we visited Balliol College, Dr. Jowett showing us over the new hall and

chapel, and the new reading-room established in the old dining-hall, in addition to the old library. In the reading-room I was naturally pleased to find two copies of the first edition of the *Principles* placed side by side. It is not often a library has two identical copies of a book of that sort.

". . . Two of the booksellers here have the second edition in their windows. Mill's reputation is said to be rapidly declining in Oxford—in fact, they say he is almost overlooked in the examinations.

"After Balliol we went to All Souls, where there are fine libraries, and where they gave us old ale and very good tea.

"I am going to breakfast this morning with one of the secretaries of the Association, and must therefore close. I think I shall go to Dover this afternoon, but have not yet looked out the trains.

"I have some prospect of making important price-list discoveries in the Bodleian."

He went to Paris, for a few days only, to see the Paris Exposition before beginning the work of the session.

To his brother Tom.

UNIVERSITY OF LONDON,
BURLINGTON GARDENS, W.,
31*st October* 1878.

"As usual, I seize a vacant hour in the B.A. examination to answer your last letter. I have been much pleased to hear about your country retreat in the Adirondacks. . . . It must much resemble my Norwegian life, barring the shooting, and barring also the interest and variety that attends the travelling from inn to inn in Norway. We must go there on the next opportunity. As to my visiting America, the expense, length of voyage, heat of the climate, etc., render such a trip scarcely practicable.

"I have now published my article on the Amusements of the People in the *Contemporary Review*. It is partly the outcome of our investigations in Denmark and elsewhere. I have not seen much notice of it in the press, though there have been several articles, I believe. Various friends have expressed themselves much pleased with it. The *Spectator* remarks that it is *trite*, which, perhaps, is a somewhat fair criticism.

"I have, as usual, got a series of books and articles on hand, all of which want writing immediately, and I sometimes feel desperate about ever getting them done. But the sale of the books is certainly encouraging; the *Principles* is soon to be in the third edition, and is adopted as a text-book at two or more universities.

"I hope your family are all well and flourishing as much as ever. It is a blessing to have such fine healthy children. Ours are in capital health, so far, and both get on very well, except that they will quarrel and fight, even at their tender age.

"We have now got into the thick of the normal sun-spot crisis, and when this is over, there will, I hope, be a rapid recovery of trade. I trust you will have a harvest these next few years.

To his brother Tom.

UNIVERSITY OF LONDON,
BURLINGTON GARDENS,
14th November 1878.

"I was much pleased with your last cheerful letter, as it seems to show that you are all well and fairly prosperous. I hope business is better in New York than England, and that you have not suffered from the late great fall in corn and cotton. In any case, I trust that there is a good time coming now that the normal crisis is past.

"I have just written an article on crises, for *Nature*, and if I can, will send you a copy; but the American post office is so badly managed that there is little inducement to send papers or books. I have never received the *Evening Post* you sent.

"My theory of crises has the appearance of being a little too ingenious, and it requires some boldness to publish it without more evidence. But I have great confidence in its substantial truth, and when I have worked the thing out more, shall perhaps write an article for the *Princeton Review* on the subject, though when I can do it must remain uncertain.

"I am glad you approve my Amusements article. I intend, in the course of time, to treat a whole series of similar social subjects, but each article requires much consideration

and reading, and I can only get on slowly. The press has not noticed the article much here, but I have heard of numbers of persons privately who read it with approbation.

"About politics, I confess myself in a fog. Sometimes I think Beaconsfield deserves hanging, and at other times I rather admire his cool and daring assertion of British power. But I prefer to leave *la haute politique* alone, as a subject which admits of no scientific treatment. I have enough to think and write about which I can somewhat understand, without troubling myself about things which I cannot understand.

"I have just had a pleasant lunch at my little club in Savile Row with Harry Roscoe and Huggins the astronomer. They are agitated by the supposed discovery of Lockyer that the elements can be decomposed. Harry has been going over the experiments with Lockyer at South Kensington, but is going to investigate the matter more at Manchester. My impression is, it is a mistake, and that Lockyer will have to draw in his horns, *mais nous verrons.*"

In the *Contemporary Review* for January Mr. Jevons published an article on "A State Parcel Post."

To E. J. Broadfield, Esq.

HAMPSTEAD, *2d January* 1879.

"It seems an age since I heard from you; indeed it was, I think, last year, and that is too far past to allow of my waiting longer before asking how you are. I see you now and then reported at the school board meetings, and I daresay the school work occupies you a good deal. I suspect that they will gradually put more and more work upon you.

"The main point, however, is, when will you come and pay the long-promised visit? Choose your own time, so that when you come we can have a good round of amusements. I am rather in want of diversion, having been sticking rather close to work for some months back. My health has been so remarkably better this autumn that I have taken to working double shifts, evening as well as morning.

"How do you like my Parcel Post article? It was rather hastily finished, and contains a few stupid blunders;

but I think it is mainly unanswerable. I have plenty more articles to come, if Strahan does not tire of them.

". . . But the burden of my letter is—come as soon as you can, and pay us a good visit, and in the meantime, write a line to say that the New Year promises well and happily for you, as it does for us."

To M. A. de Foville, Chef du Bureau de Statistique du Ministère des Finances, Paris.

HAMPSTEAD, *1st February* 1879.

"I am much indebted to you for your very kind letter on the subject of Commercial Crises, which I have been thinking over for a week or more. As regards the book of M. Juglar, I have had a copy for some time, though I have not read the whole of it with the care which it deserves. His information about the crisis of 1804-5 is valuable, in addition to others I have since gained, but it does not satisfy me, inasmuch as the crisis of 1809-10 was in any case a much greater one, and is the *only great* exception to the decennial periodicity.

"I have a good deal of information about the sun-spots and other physical fluctuations, but am yet far from fully acquainted with the facts of this complex subject. I shall have an opportunity of consulting the *Annuaire du Bureau des Longitudes de* 1878, in London, and expect to get from it the latest information.

"I cannot easily explain the greater regularity of the commercial series as compared with the physical series of events. The proper working out of so complex a subject must be a matter of time, and what I have printed is only the first germ of what I hope to publish in the course of some years. Other engagements will prevent me from following the matter up as rapidly and fully as I should like, but when I write anything more on the subject (in an American review or elsewhere) I shall have the pleasure of sending you a copy. In the meantime *I will take the liberty of assuring you, with great confidence, that the theory is a true one, and will ultimately be proved to be so.* But this must be a matter of time and labour.

"*P.S.*—The apparent irregularity of the sun-spot curve

at the beginning of the century—1779, 1788, 1805, 1816—has been carefully discussed in England, and Mr. J. A. Brown has shown (*Transactions of the Royal Society of Edinburgh*, 1876, vol. xxvii., p. 563) that Wolf was probably wrong. For Wolf's minimum in 1776 he substitutes a maximum, and he thinks that there was a small maximum in 1797 overlooked by Wolf. Brown is a very able meteorologist, and he throws great doubt on the accuracy of some of Wolf's numbers. He conclusively proves, too, that the average period is not the 11·1 years of Wolf, but 10·45. Eventually it may be found that the physical fluctuations are more regular than is supposed, but the facts are numerous and complicated."

On the same day he wrote to his brother:—

". . . I doubt if any one really remembers a better skating season than we have just had—some six or seven weeks of frost, with only slight intermissions. Of late, I have been some four or five times to the great reservoir at the Welsh Harp, near Hendon, which I can reach in three-quarters of an hour by the Midland Railway. There we have enjoyed a run of one and a quarter mile straight on end, over fair, perfectly safe ice. In all, there is an unbroken space of 350 acres. Yesterday I did the mile and a quarter, with the wind in my favour, in five minutes fifteen seconds. Against the wind it was a different matter."

To John Mills, Esq.

2 THE CHESTNUTS, WEST HEATH,
HAMPSTEAD, N.W., *12th March* 1879.

"It is very kind of you to ask me to go to Manchester for the silver debate, and to stay with you at the same time. I should like much to see you again at Northwold, and will hope for some opportunity of doing so. But the silver question would interfere with my class, which is held on Wednesdays; and as there is only just time before the end of the term to finish my promised course, it would create some inconvenience. After two weeks more of lectures I shall be free for the summer. As regards silver, I do not think there is much if any good in discussing it. The matter must be left to take its course. *Nothing can be done*, and it is beating

the winds to talk as if we could set everything right as we like. Above all, the Indian currency problem is one which admits of no solution except that of *laisser faire et laisser passer*. In fact, any attempt to tinker it up would inevitably fail, and if a gold currency could be introduced there, which I do not believe, it would only intensify the comparative superfluity of silver and scarcity of gold, which is, or rather has been, at the bottom of some of our troubles here."

To his sister Lucy.

ATHENÆUM CLUB, 18*th March* 1879.

"On the occasion of my first visit to my new club I think I had better use a little notepaper in writing you a few words, though I have nothing special to say. The Athenæum is a very fine place, and it required courage this afternoon to walk in and announce myself as a new member. However, the porters did not seem at all surprised, and I daresay I shall soon learn to enjoy the easy-chairs and sofas and the fine library, and numberless comforts and conveniences of the place, not to speak of the society. It is also pleasant to know that I was elected through the support of a philosopher for whom I have a great regard and admiration.[1] . . ."

To his brother Tom.

ATHENÆUM CLUB, 31*st March* 1879.

"Since last I wrote to you I have become, as you see, quite a swell, having been elected to this club under the rule allowing a limited number to be elected specially by the committee. It is a most luxurious place, with all kinds of swells about. I daresay I shall like it more and more as I become accustomed to it.

"I have been very busy of late with many things, but have rather run myself down, and need a few days' holiday. Just lately I have fortunately found the required keystone to my commercial crisis theory, in the prices of corn in India, which in a large part of the last century show a wonderful periodicity. I have got tired of my proposed *Princeton* article, but I must try what I can do soon.

[1] Mr. Herbert Spencer.

"We are all well at home, the children very lively, and Winefrid becoming very winning and pretty. Yesterday I began a little lesson to 'boy' on the making of bread, and told him it was made of flour. 'Do you mean cauliflower, papa?' was what the little fellow asked, after some reflection.

"*P.S.*—I am the more pleased at my election to the club, inasmuch as it was Herbert Spencer who moved and managed it; and as he is a constant frequenter of the club, it will give me an opportunity of becoming well acquainted with him."

In the first week in April Mr. Jevons and his wife paid a brief visit to his cousin Mr. Arthur Jevons, in the New Forest; and when she returned home to the children he remained away a few days longer by himself, being in need of a rest from work.

To his Wife.

THE THREE SWANS,
SALISBURY, *8th April* 1879.

"I have just received your letter, and am glad to find that all is right at home. I have decided to stay here the rest of my visit, only making excursions in the neighbourhood.

"This afternoon I shall probably go to Romsey, as the church there is said to be very well worth seeing.

"I like Salisbury very much; and it fortunately happens that they are having special musical services in the evening —8 to 9 P.M.—at the cathedral, which occupy the time very pleasingly. They have a fine new organ, with a good organist, and very careful singers, and with the cathedral lighted up by gas, the effect is very beautiful. Two nights they are going to have portions of Bach's *Passion* music.

". . . I have done a great stroke in book-buying, having bought a remarkable collection of nearly five hundred economical and political pamphlets at about a halfpenny each. Some of them are evidently valuable and rare. One of them contains copperplate diagrams of prices for some centuries. One or two are by Robert Owen. I also got a carefully-written list of them all, as good as a catalogue.

"The cathedral has been elaborately restored, and looks much better than when we saw it."

Among these pamphlets Mr. Jevons afterwards found one—*Observations upon the present state of our Gold and Silver Coins*, 1730, by the late John Conduitt, Esq., Member for Southampton and Master of His Majesty's Mint, which proved of rare interest to him. He made a special reference to it in the article on "Sir Isaac Newton and Bimetallism," which was published in his volume of *Investigations on Currency and Finance*.

To his Wife.

SALISBURY, 9*th April* 1879.

". . . Yesterday afternoon I saw Romsey Church, one of the best specimens of late Norman—beautiful and interesting. Dined there. Not having you to look things out, I made a mistake about the train, and had to wait one and a quarter hour at Romsey station. After getting back saw a little of the entertainment of the Vokes Family, whom I somewhat like. This morning I went to the cathedral again, and afterwards to the Blackmore Museum, which I found a very excellent little museum, and am pleased I did not miss it. This afternoon I have been by rail to Wilton, where I was about half an hour in the Wilton House—that of the Sydneys and Herberts. Superb but of course small collection of Greek and Roman antiquities, like a very small Vatican. Many excellent pictures and portraits, especially Vandykes, one an enormous but good family group, filling the side of a room.

"I saw many of the family rooms, some of them delightful, especially the library. Saw the lock of hair which Queen Elizabeth gave Sir Philip Sydney, and had a glimpse of the beautiful park where he wrote poems, etc. etc. Then went to the beautiful and remarkable Wilton Church, a modern imitation of a basilica, built and decorated at a cost of £80,000. The detached campanile is one of the most beautiful towers I ever saw.

". . . In the evening there is the Bach music at the cathedral."

On the 24th April he published in *Nature* a second article on "Commercial Crises and Sun spots." The second edition of the *Theory of Political Economy* was completed this spring; besides revising it, he wrote a new preface of

considerable length, and it was otherwise enlarged; a list of mathematico-economic books and memoirs being given as an appendix.

To the Rev. Harold Rylett.

HAMPSTEAD, 25*th April* 1879.

". . . My interest in Ireland is rapidly increasing, and when I had a run of a week through some parts, I resolved to come again. I think that when you have had time to become thoroughly acquainted with your part of the country I should much like to spend a few days with you, and see the state of things with my own eyes. My impression is increasing to the effect that landlordism is a terrible burden on the country, and that the just laws of England are rather a myth. In the middle of the summer I shall have to go to Norway for the benefit of my health, and perhaps it is too soon to suggest any definite time yet. The climate of Ireland in the middle of the summer would, I fear, be too relaxing for me, and I need bracing up a good deal."

To his sister Lucy.

BUXTON, 18*th May* 1879.

". . . I have had rather a nice little tour, visiting Ely, Norwich, Peterborough, and Nottingham. At Ely I was specially pleased, and by great good luck went there the very night on which there was a performance of the *Messiah* by gas-light in the cathedral, which looked remarkably fine. Peterborough was also very pleasing. Norwich is an interesting old town. Besides the cathedral there, the Nottingham Castle Museum was well worth seeing. . . .

"This hotel (The Palace) is a very pleasant place after some of the commercial places I have been in; and I find a friend here, Mr. Hecht, the musician of Manchester, whom I always like to see. To-morrow morning I go to Manchester, and then in the evening home."

And again on 21st May, he wrote:—

". . . If you are in Epsom during the Derby week, I should certainly wish to visit you and see the races. I am thinking of republishing my article on Amusements in a much enlarged and improved form, and should like to make some references to the Derby. . . ."

To his brother Tom.

CHESTNUTS, HAMPSTEAD HEATH,
18th June 1879.

"I have been much pleased to get your recent letters, especially as they give one a cheerful idea of your family and business. I think trade must revive now by degrees, and probably more in the United States than here, where there has been a considerable stock to credit. The extract about *seccas* in Brazil may prove to be of great importance, and I will try to follow it up as soon as possible, but I am engaged in so many things that, like the six omnibuses abreast through Temple Bar, they block each other's way.

"On 9th July I sail to Norway with Arthur Jevons, and hope to have a healthy, pleasant tour of five weeks. Until then I shall be almost taken up with examinations, as, in addition to the University of London, I am to examine this summer for the Indian Civil Service in logic and political economy, for which I shall get £40.

"I am thinking of bringing out my essay on the *Amusements of the People* as a popular Mudie book, and have just written to Macmillan proposing it. The subject is being a good deal taken up in England (though, perhaps, not in consequence of my article) and I hit the right moment to write upon it. Although we were neither of us very well, I always think our Dano-Swedish tour was a most instructive and interesting one.

". . . Our children progress rapidly. The 'boy' is very wide-awake. 'Oh, silly papa,' he remarked the other day, when I ran his kite into the middle of a fir-tree, and dragged it out with the loss of half the tail. He shows considerable musical taste, and conducts a band consisting of his own self, by the hour together, singing very melodiously to his own tunes.

"Winefrid is a shy little thing, but is for all the world like some of Reynolds' pictures. She is just beginning to talk."

To his Wife.

LAERDAL, NORWAY, *Friday, 26th July* 1879.

". . . Arthur is altogether delighted with Norway, except,

indeed, as regards the fishing, which is disappointing. He is one of the few who thoroughly appreciate the scenery and the people.

"We have had so far a most pleasant tour, visiting, however, for the most part, places familiar to me. Christiansand to Egersund by a pleasant steamboat; thence by a new railway to Stavanger. Then by the 'Folgefonden' (steamboat) to Utne, where we landed and slept—then Odde. Here I ventured to undertake the Skjeggedals foss expedition, and was rewarded by a most beautiful and glorious sight of the foss. But the work was just about as much as I could stand, beginning (after a row down the fiord) by four hours' walking, or rather scrambling, over rocks and rough stones, up and down rough ladders and nasty places.

"Then to Eide, and after sleeping at 'Moellands,' over the fjeld to Ulvik by a road which presented no particular difficulty, a stollkaere taking our luggage, while Arthur and I walked. About half-way we came on a beautiful little lake, where we stayed to fish, sending the boy on with the luggage, and to bring back beer and supper: which he did. The weather being very fine, we had an enjoyable day. At Ulvik we spent part of Sunday in the middle of a very social party of Norwegians, and in the afternoon went by steam to Vik. We had thought of visiting the Voring Foss, but abandoned it in favour of a day's fishing in the river, paying 4s. each for the privilege, but catching little or nothing. The road to the Voring Foss does not seem much better than that to the other, and is not really safe for horses. One lady in a large party fell off her horse and narrowly escaped falling into a river, her shawl actually going. I have felt glad I did not venture with you in former years, as in my then state of health, my nerves could never have stood taking you along such roads.

"At Vik we became intimate with a Norsk lady and her accomplished daughter, who played and sang to us, and lightened the hours which were not employed in fishing. We parted on the best terms at Ulvik. Returning to Eide by steamer, we drove the same evening to Vossevangen, where Fleisher and his Frue and the Fröken welcomed us as pleasantly as ever. They inquired after you, as have

done also several people, so I showed them the photographs of the children. The house was, as usual, full of a medley of travellers from all parts.

"Our journey from Voss to Gudvangen was spoilt by a very rainy day, and from Stalheim we could barely see anything. I had a difference with two odious Englishmen, shopkeepers in the city, who were trying to get past us, and one of whom actually forced his cariole past mine, when, in a heedless moment, I left a little room.

"*27th.*—My letter was broken off by Arthur coming in to say that the road was broken by a flood in the river, somewhere between Husum and Blaaflaten. For some hours there was great anxiety in our party lest the odious Englishmen should not be able to pass and should return. . . . We have met with a most agreeable American party, consisting of two well-travelled ladies. They travel with a quiet brother.

"We hear this morning that the road is passable again, and Arthur, having found that the fishing is not free here, wants to push on to where we can do something.

"We have now the road to Christiania straight before us, and all is plain sailing. We shall just linger at Maristuen or elsewhere, as we feel inclined. My health is benefiting immensely, and I go through long days of sixteen or eighteen hours without any sensible fatigue. . . . I long to get back, however, and only stay here because I feel sure it does my health lasting good. I am often amused to hear travellers here quoting to me my own insertions in Bennett, especially what I said about our climb at Nystuen. The English and Americans are all wanting to go up."

To his sister Lucy.

MARISTUEN, VALDERS,
about 1st August 1879.

". . . Arthur and I have had a most pleasant, and indeed glorious tour, so far, and though the ground gone over is almost as familiar to me as Hampstead, yet I enjoy it hardly the less. Arthur is charmed with Norge, and appreciates the scenery and life thoroughly. He fishes sometimes the whole morning, but is not satisfied with the trout

he gets. Although our route is mostly old to me, I have been able to do some new things, such as visiting the great Skjeggedals foss in the Hardanger Fiord. This is difficult to reach, as it lies among high mountains, and requires first a row in the fiord, then a scramble of three hours over rocks, and then a long row on a grand lake. As you pass round a turn in the lake you see the great foss falling down in a great leap 1000 feet—a river pouring off the top of a mountain. It was an exceedingly beautiful sight, and with the possible exception of Niagara I have seen nothing more grand and impressive in that way. The whole excursion took us eleven hours; but two Swedish ladies did it the same day, and beat four men in the party. Yesterday evening I had again a great treat in a very successful ascent of the mountain Suletind, which lies above here. The air was so clear and the weather was so favourable that I determined yesterday to ascend without delay, and taking a native boy as guide, started at 4.15 P.M.; and after three hours' heavy walking, got to the top, which is 3200 feet above this place, and between 5000 and 6000 feet above the sea. The air was perfectly clear, and I saw to great distances. On the north there is a great range of craggy peaks of fantastic shapes, with glaciers on their sides. In the distance were two great snow-fields, and in every other direction were great mountains, and a desolate expanse of fjelds, with patches of snow and many lakes. It was a splendid sight. . . . This morning we have had a very amusing scene here, as the king travelled past about 1 P.M. His journey has been long looked forward to; but we are here so much among the mountains that only about a score of men and as many women could be got together at the station, where he changed horses—the farmers around being obliged by law to send sixteen horses for his use. I spent the morning agreeably with two young Norsk ladies, who are staying in another house which has recently been built for the old father and mother of the station. The 'fröken' (young ladies) induced the men to cut a lot of birch trees and decorate the road with two arches, in which I assisted them, sacrificing some old sea-lines for the purpose. It was altogether an amusing morning. When the king was so

long in coming the 'fröken' induced the young men and girls to go into the house and have a dance, and I saw a very pretty dance of two, a young man and girl beginning rather solemnly and ending in a rapid valse. Then the king's approach was announced by the boys on the top of the hill, and they all ran out, the women grouping themselves very prettily on the door-step (as seems to be the etiquette) with the young ladies in front, and also the old lady of the place in a very formal, white-winged cap. As soon as the king's horses were taken out they made straight for the decorations and began to eat them. A young Swede and myself were the only men strangers present, and the king gave us a nod and a smile. The horses were changed in solemn silence, the king and the prince with him sitting in their small, open carriage all the time. The station-master had previously tried to train the people to give an 'hurra,' and once during the morning I heard some curious sounds, and going out, I found all the people grouped ready and practising 'hurraying;' but the effect was so poor that the idea was abandoned. About an hour after the king was gone, and while I was having dinner, the king's baggage unexpectedly came up, with women, men, and servants. Some mistake had been made, and the horses for these people had been sent away. A long piece of work ensued, of which I only imperfectly gathered the drift; but the king's men, who were very polite, improved the delay by drinking beer."

To his Wife.

NYSTUEN, NORWAY, 1*st August* 1879.

"We are kept in the house this morning by a very cold windy day, with clouds and threatening rain, which does not suit the mountains. We intended to have gone up to the parts you know so well and fish the lakes there, but what we shall do now I cannot say. I have written some account of my ascent of Suletind in my letter to Lucy, and also of the king's journey through the Fille Fjéld. We hear that the king stayed three or four hours at Nystuen, and fished on the lake, while the prince, who was with him, went up the mountain which you know.

"We have had the usual succession of amusing little

incidents. At Maristuen we were uncommonly comfortable, having the place nearly to ourselves, with a good waiting-girl and plenty to eat. The old lady you probably remember has gone to live in a new house, built for the parents, opposite, and the son and his wife now occupy the old house as station-holders. The old lady came to shake hands with me, and was very friendly, and we were offered port wine and corn brandy as a mark of favour. We have some interesting fellow-travellers. In the house here just now is Ole Bull, the celebrated Norsk musician—a venerable-looking old man with a daughter. At Maristuen we had what seemed to be an English working-man making a tour, partly on foot—a short, strong man of some intelligence, for whom I acted as interpreter. . . .

"There is said to be a bear, with four little bears, going about this neighbourhood; it was seen at the other side of the lake, and also at the Saeters on the road, but we have not been able to catch sight of it. They are said to be harmless animals as long as not interfered with. You need not fear my falling into its clutches, for I shall not post this till I have gone on to the next station, where there is a post and no bears.

"I have had rather good fishing the last day or two in the river on this side of Maristuen, catching some eight or ten nice trout of a half or three-quarter pound each."

FAGERNAES, *8th August.*

"We are now within one week of the end of our journey, as I have written to engage a berth for the *Angelo* of the 15th August. I have been very lazy of late, and you must excuse my not having written oftener. I think you told me not to write much. I do not know when you will get this, as there is no post, but I am sending it by diligence, that is, the diligence which now runs on the Fille Fjeld road, to Odnaes to be posted."

To his little Son.

STATION HOTEL, HULL,
Sunday, 17th August 1879.

"You will be pleased to hear that papa has got back from Norway, and is coming home to Hampstead the day

when you get this, about four or five o'clock in the afternoon. Papa will like very much to see again mamma and you and baby. I hope that you are all quite well.

"Papa has come a long way over the sea, like the sea you saw at Eastbourne, and now he is coming by a railway train, and then in a cab up the hill at Hampstead.

"Papa is quite well, and has a great deal to tell you about Norway.

"Give mamma and baby some kisses for me, and tell them I am coming."

To R. O. Williams, Esq.

HAMPSTEAD, 29*th August* 1879.

"I beg leave to thank you for your kindness in informing me of the adoption of my *Political Economy Primer* in Oakland.

"I believe I shall receive a certain royalty on the copies or editions sold by Messrs. Appleton and Company, though the profit on the American sale is usually not half that on copies sold in England.

"Among those who consider the subject dispassionately, there can be but one opinion about the justice and expediency of international copyright, and I quite expect that the American nation will presently feel this. It is only the interests of a limited number which lead them to persuade the people to the contrary.

"I do not pretend that the income from my books is a matter of indifference to me, as it makes a convenient and increasing addition to a very limited income. But I must also say that were there no profit—as there practically is not—upon certain translations, it is always pleasing to hear that the books are in use and are liked. I believe that school-books are one of the most important departments of literature, and I hope to be able to produce several others in logic or political economy.

"I am at present engaged rather arduously upon a *Logical Exercises*, designed for college use, and intended to exercise students in accurate thinking."

To E. J. Broadfield, Esq.

CLIFF HOUSE, BULVERHYTHE,
NEAR HASTINGS, 15*th September* 1879.

"We have moved into pleasant healthy lodgings here for some weeks, and your letter has come on from Hampstead. In spite of the kindness of your invitation, I have not the least intention of visiting the Social Science Congress. In the first place, I must stay here and take care of the family; and, in the second place, I cannot endure the idea of being shut up with crowds of people talking social science. If I came at all I should prefer the Library Association, but even that is quite out of the question.

". . . I find this is a capital place for work, and after my Norsk tour I am in good trim. The house is close to the sea, about two miles west of the end of St. Leonards, and is exceedingly quiet in position. But I walk into Hastings now and then for a little music and variety. The children enjoy themselves greatly, and are in high spirits.

On the 6th October he wrote to his sister Lucy from Bulverhythe:—"We are now within the last few hours of the end of our visit here, and are leaving this pleasant spot in beautiful sunny weather. We have, indeed, been very fortunate almost the whole of the four weeks, having had few days' rain. This is a capital place for children, being only a few minutes' walk from a beautiful quiet shore, where at low-water are sands to dig in. It has been an admirable place also for writing. On the pier at Hastings there is a capital string-band which gives three concerts a day, and I have often walked in, in the afternoon, stopping the evening sometimes. The little ones are wild with health and spirits. Herbert, although hardly four, is becoming a capital little walker."

The writing to which he refers was the *Studies in Deductive Logic*, with which he made considerable progress during this month. To his friend Mr. James Sully he had written a few days previously: "My work on my Deductive Exercises in Logic gets on well, but it is like constantly setting oneself difficult papers and then answering them, and after four weeks' continuous examination of this sort every morn-

ing, working up the subject occasionally in the evening as well, I find my digestion slightly disordered."

To H. S. Foxwell, Esq.

HAMPSTEAD, 14*th November* 1879.

"Your last letter was one of great interest to me, as I much value any such opportunity of getting to know what people think at Cambridge. As regards Macleod, I do not wish to enter into any dispute. I have said the most civil things I can of his books, and I see no need to dwell upon his errors, because they are not likely to do any harm.

"I regret leaving out Mr. Thornton's name as regards the wage-fund theory. It was an oversight. Cairnes professedly supports the theory, but his arguments really tend against it in a deadly manner. He cannot stop at any definite *non-competing* groups, and his ideas followed out lead to entire rejection of the theory.

"I daresay Sargant's book might have been mentioned also, but I forgot it. You will observe that my bibliography only extended to mathematical writers, and I certainly never intended, in a few pages, to sketch the history of political economy generally in a complete way.

"As regards the analogy of laws of wages and rents, of course I do not know what Marshall gave in his lectures in 1869, as I neither attended them nor have seen notes, unless, indeed, the answers of some candidates. But I do not remember that they said anything on the matter. My ideas on the subject have been gathered perhaps most clearly from Cournot's *Recherches*, which suggests the general method of attacking the subject. However, if I am ever able to get through my large book on *Economics*, I shall take such a very different line of general treatment that there will not be much room for dispute. Many different lines of argument, including that of Cairnes, converge to something quite opposite to Ricardian doctrines.

"As regards Marshall's originality, I never called it in question in the slightest degree, having neither the wish nor the grounds. On the other hand, you seem to forget that the essential points of my theory were fully indicated as far back as 1862, at the Cambridge Meeting of the British

Association. I have no reason to suppose that Marshall saw any printed report of my first brief paper; but of course, on the other hand, in my book of 1871 (*Theory of Political Economy*) I could not possibly have borrowed anything from Marshall. But these questions are really of little or no importance now that we have found such earlier books as those of Gossen, Cournot, Dupuit, etc. We are all shelved on the matter of priority, except, of course, as regards details and general method of exposition, etc.

"I have, of course, got Marshall's book, but have really not been able to read it with care, having my head full of Mill and De Morgan's logic, with some 150 London candidates as well. Now I have got 19 honour candidates in a two days' examination, some of them writing four books a piece in three hours! From what I gathered, in a cursory reading of the *Economics*, together with reliance on Marshall's scientific powers and the careful revision it had undergone, I welcomed the book as getting me out of a difficulty in regard to the Bankers' Institute examinations, for which I have proposed it as the first text-book. I hope, however, the *Athenæum* is not right in claiming the book as written *on the lines of Mill* exclusively. I thought there was much divergence. However, from considerations which it is difficult to describe briefly, I have suggested Mill's *Political Economy* for the Bankers' Institute, and I even use it in my own class still. Thus, however violent my attacks on the logic of Mill, I cannot be accused of one-sidedness. Nor am I inconsistent; for it is one thing to put forward views for rational judgment of competent readers, it is another thing to force those views upon young men by means of examinations. The Mill faction never scrupled at putting their lecturers and examiners wherever they could, but I believe it only requires a little clear logic and a little time to overthrow them."

In the December number of the *Contemporary Review* he published his third article on "John Stuart Mill's Philosophy Tested."

CHAPTER XII.

1880–1882.

IN the February number of the *Contemporary Review*, 1880, Mr. Jevons published an article on "Experimental Legislation and the Drink Traffic." On the 24th February he wrote to his sister Lucy:—

". . . I have got so much on my mind just at present, that I hardly feel equal to all I have to undertake—my nerves sometimes appear quite unfit for the burden of a family, many acquaintances, lectures, business, etc., in addition to two or three books, and many articles which are always in my head. . . ."

And again on the 12th March 1880:—

". . . We all walked on the Heath yesterday, and Winn afterwards expressed her satisfaction at walking with 'my Papa.' . . . I had a pleasant tour for a few days to Rochester, Margate, Broadstairs, Ramsgate, and Canterbury. At Rochester I stayed at the Bull Inn, where the Pickwickians began their tour, and there was much to remind me of Dickens. Broadstairs, Dickens' favourite watering-place, is a pretty little place, and I spent a quiet evening there. Canterbury I liked as much as ever, perhaps rather more."

Mr. Jevons not unfrequently took two or three days' tour from home for the sake of a change of thought and rest from the ever-increasing burden of work, which he could not turn his mind from at home.

To E. J. Broadfield, Esq.

ATHENÆUM CLUB, PALL MALL,
6th April 1880.

"I shall be much pleased if you can meet my brother

in New York, and I am sure that he too will be much pleased. . . .

"I congratulate you on the result of your labours in Manchester. I found evidence of your activity now and then in the *Guardian*. As for myself, I feel I can again be proud of the name of Englishman.

"I have just been at the declaration of the poll at the University of London. Of course Lowe was very well received, but he made an unfortunate speech, if speech it could be called. He appeared to labour under difficulties the whole time, and was excessively nervous; indeed, he appeared to be breaking down once. I fear that age is telling upon him seriously, and I think he would do well to go to the House of Lords. I hope the papers will not report what he said about the Government doing as much as possible in the first year or two, as they might soon disagree. Too true, no doubt, but not *à propos*. In fact, Lowe was about as happy in his probably final appearance at the University of London as I should be if I went on the stump. Sir John Lubbock, too, appears to like speechifying about as much as I do, and added nothing to the liveliness of the meeting.

"We had quite an exciting time on Saturday at Hampstead, and 'Boy' was delighted with the brilliant display of flags in High Street, and the continual procession of cabs and omnibuses along the Finchley Road. We did our best, but failed. It is said that the city people are too much interested in maintaining the *status quo*, and they live so much in the suburbs now as to make an altogether preponderating vote with the aristocrats and various other foolish people.

"All well at home. Our little one, 'Winn,' would please you now, I think.

"By the by, I should add that my brother is leaving New York for England towards the end of April or beginning of May, but I hope you will find him still there."

On the 8th of April a second little daughter was born, for whom he chose the name of Lucy Cecilia.

During the spring months Mr. Jevons was not at all well, continually feeling tired and overworked. In May a summons to serve on the grand jury unfortunately kept him at

home when his wife and family were away. Feeling that he must lessen his engagements, he resigned his office as one of the secretaries of the Statistical Society, and was appointed a vice-president instead.

To the July number of the *Contemporary Review* he contributed an article on "Postal Notes, Money Orders, and Bank Cheques."

Early in July Mr. Jevons went to Norway with his brother for a few weeks; he had long looked forward to the pleasure of showing some of his favourite parts of Norway to his brother, and they hoped also to visit some parts of Jotunheim, which would be new to them both. They landed at Christiania.

To his Wife.

ÖLKEN, SLIDRE.

"We are now taking an easy day at this pleasant little inn, which you will remember our visiting . . . and intend waiting a day for better weather. From Fagernaes we made an attempt to reach Jotunheim by the valley of Östre Slidre, where we went up once or twice to get a view of the mountains. We went three long stages with horses from Fagernaes, and then put up at the small house of Gulbrand Beito of Beito. It then came on to rain, and we waited nearly three days. Beito and his family were very primitive and amusing, and used to come and sit with us and talk at great length. I could almost always understand Beito, who was a great rough-looking man, like a Viking, but his wife chattered so fast I could hardly catch a word. One morning a girl came in and played us a number of tunes on the Langeleg or ancient Norse Zither, some of which were very pretty. We fished in the river and trolled in the Öiangen Fiord near by, but caught little, and the young men who went with us were equally unsuccessful with their nets; but I learned how to fish with the otter, which has ten or more flies on the line.

". . . Yesterday Beito and another man brought us here in two frightfully shaky stoldkjœrres. The first part of the way was over rough stones and rocks, and the latter part right over the mountain behind Ölken. This part we walked. It was wet more or less all day, but at

Nordthorp a fine old landsman gave us cognac and a good dinner, and dried our clothes, and to-day we are both very well. . . . To-morrow we shall probably go to Skogstad, and we may perhaps make an excursion up the Tyen Vand, but we have given up all ideas of going far into Jotunheim. Afterwards we shall probably go north among the fiords you know well."

To his Wife.

HOLDT'S HOTEL, BERGEN,
1st August 1880.

". . . After our retreat from Beito to Ölken the weather began to mend, and finally became very fine and settled. We drove up to Skogstad, and leaving most of our luggage there, set off at once for Tvindehaugen on the Tyen Vand. We had a beautiful calm row of two and a half hours over this grand lake. On reaching Tvindehaugen we fortunately found that few or no people were going to stay the night, and getting a fair dinner we determined to ascend Skineggen at once, in order to secure a clear view. There is no difficulty about this, as the height above Tvindehaugen is only 1600 feet. We enjoyed a glorious view of the Jotun Mountains close at hand on the north and west, and a distant view to the south and south-east. Tyen Vand looked very beautiful too, with its islands and snow-patched mountains. Staying up until 9 P.M. we had some fine sunset effects, and then easily reached the hut again at 10 P.M. . . .

" Next morning we went on to the hut at Eidsbugarden at the head of Lake Bygdin, where, however, the view was not equal to that at Tvindehaugen, although still very fine. There I was taken quite ill. . . . I nevertheless went out with the idea of climbing a hill to get a view, but soon found the air exceedingly chilly and had to retreat to bed. By great good fortune there were beds for us; each hut consists of three small rooms, the middle one with beds for men, and table for eating, etc. The inner room with beds only—assigned to ladies when there are any, and kitchen. . . . During the night two parties of students had arrived from the mountains; one party having lost themselves at 10 P.M. on the previous night, and actually slept four hours on the open fjeld at a great elevation. As the place would probably be

full in the evening, and was most unsuited to me, Tom and I abandoned all other schemes about Jotunheim and resolved to retreat at once while the weather admitted of it. After some delay we got a packhorse for our luggage at noon, and reached Tvindehaugen walking at half-past one, whence, without dinner, we took the boat which was waiting, and after a slightly rough row got across the Styx again, as we called Tyen. . . . I managed to walk down to Opedals Sœter, where was a small bedroom with windows that would not open, and beds, etc., just painted; as it was impossible to stay here, we got a little open cart, with a packing-case in it as a seat, and drove down to Skogstad, where I went to bed thoroughly knocked up. We had to stay here two or three days while I recovered. . . . The landlord was very kind and attentive, and then sent us on in his best carioles to Nystuen.

Monday, 2d August, s.s. *Olaf Trygvesson*, off Holmen. —We are now making for the Romsdal on board this new steamboat. . . . After two days' stay in Bergen we are both quite well. I am very homesick and long to be back with you again."

He returned from Norway in the middle of August, and on the 1st September he went with his family to the seaside for a month, and the following day wrote to his sister Lucy:—

"We have now settled down in our new house. . . . Littlehampton is a very little place, but the sands are very good, and there are plenty of places for excursions; the whole country round is new. . . . I am sorry to say I have discovered there is a parrot in the next house, which I did not hear when I took the house, and I have spent a large part of the morning hunting blue-bottle flies. Yesterday afternoon there was a fearfully loud grinding organ which could be heard all over Littlehampton; nevertheless I hope to get on pretty well with the proofs and other work at present rather pressing on me."

To H. S. Foxwell, Esq.

LITTLEHAMPTON, 9*th September* 1880.

". . . I am now near the end of my arduous *Studies*

in Deductive Logic, having sent off the preface and frontispiece. The printers have been very tedious over it, but I hope the proofs will be done in a couple of weeks now. I shall be curious to know what you think of it.

"I wish you would get on with your *Adam Smith*. Macmillan, as you have perhaps noticed, is bringing out a translation of Cossa's *Guide to Political Economy*, and I have been reading some of the proofs. Cossa remarks on the absence of any really good edition of A. Smith, or any real attempt to treat his life and works as a whole.

"You are quite right in thinking that I hate examinations, but I hate lecturing even more."

To this translation from the Italian of Professor Cossa's *Guide to Political Economy*, Mr Jevons, besides reading the proofs, contributed a preface.

To his brother Tom.

LITTLEHAMPTON, 21*st September* 1880.

"We have now got only a week of our stay here left, and the weather has turned so uncertain that we shall not be sorry to go home. We are, however, well satisfied with the place, which, though apparently dull, is not nearly so dull as most seaside watering-places. Yesterday Harriet and I visited Chichester for the first time, and were fairly pleased with the cathedral, marketcross, and a curious old hospital for women, which has existed since 1100 or 1200. One afternoon I took a walk through five parishes, most of the churches very picturesque and antique—Norman and early English. The walk to Arundel again is beautiful, and the Catholic Cathedral there a grand piece of modern architecture, seen from every part of the plain around.

"I have just finished the final revises of the text of my *Logical Studies*, but it still remains to put the final touch to the preface, etc. Then I shall feel relieved of a burden, and more fit to set to the *Principles of Economics*. I have been working so much less, and walking so much more, than at this time last year, that I daresay I shall feel better for it during the winter."

To John Mills, Esq.

CAMDEN LODGE, LITTLEHAMPTON,
21*st September* 1880.

"It was with much regret that I heard of our friend Dr. Hodgson's sudden death at Brussels. He was so intimate a friend of yours that I feel sure you must have suffered from the loss. My acquaintance with and memory of him was disjointed and occasional, but began a long time ago, when he was head-master of the Liverpool Mechanics' School, and I was a little boy there about ten or twelve years old; but his teaching made a great impression upon me, and I have never forgotten it.

"We have been spending three weeks in this quiet but in some respects very agreeable watering-place. There is a good sea-beach for the children, who are in terribly good health, and capital excursions to Arundel, Chichester, and other places of interest and beauty.

"The state of trade now interests me very much. I believe we are on the eve of a great though, I hope, a gradual revival. The iron and consequently the coal trade must have a great expansion soon. . . . The coal trade is said to be very much depressed in Yorkshire and elsewhere; but between ourselves I believe that this is just the last of the ebb, and that a few months will see a different state of things *begin*. My only fear is of too violent an expansion, as in 1871-73, leading too soon to reaction.

"Have you ever read Thomas Corbet's book, *An Inquiry into the Causes and Modes of the Wealth of Individuals in the Principles of Trade and Speculation Explained* (London, 1841; Smith and Elder)? Though badly written, it shows a greater insight into the conditions of safe speculation than any book I ever met with, though he was not aware of the decennial variation of trade. His advice is, *buy before a rise* and *sell before a fall*. He also points out that a successful speculator must act contrary to the general opinion, as, if he buys that which people are generally buying, it will be already above the chance of safe profit. Sir I. Newton bought South Sea stock when it was nearly at the highest point!

"I hope to set fairly to work on my *Principles of Economics* in a week or two, having just completed my laborious *Logical Exercises*."

To John Mills, Esq.

LITTLEHAMPTON, 23*d September* 1880.

"My previous letter, which crossed yours of the 20th, will have told you that I sympathise with you in your loss of so old a friend as Dr. Hodgson. I regret that I had not more frequent opportunity of meeting him, but I remember with much pleasure my visit to his house when I went to Edinburgh for my LL.D. degree. My impression is that Hodgson had great powers, and that his failing was in not making an adequate use of them. I know probably all his acknowledged writings, and they are all good, but sadly too few and limited.

". . . I am not a candidate for anything, except for a study where organ-grinders and other nuisances are inaudible. I wish Bell, instead of making such wonderful discoveries as to the conveyance of sound, would turn his attention to the production of sound-proof houses."

On the 27th September he wrote to his brother:—

". . . On Saturday I had an interesting walk, going to Worthing by train and walking thence to Sompting, where the church, having a real Saxon tower, gave me a new sensation. I never saw anything like it before. Then I walked to New Shoreham, where I also inspected the church, celebrated for its peculiar Norman and early English architecture. I also saw a third fine church at Broadwater, finishing up at the Swiss Gardens, a place of recreation originally started at Shoreham in 1838, and lately resuscitated; but there was hardly any one there."

To John Mills, Esq.

HAMPSTEAD HEATH, 3*d October* 1880.

"I return the extract made in Hodgson's hand. It is interesting as showing what he was thinking of, but I have no great opinion of Baden Powell's understanding of any such subject.

"Our removal from Littlehampton and work for examinations, etc., have prevented my answering your last letter sooner, and the reasons for a rise in coal and iron are too numerous to be easily stated in a letter. The considerable fall which has taken place since I bought a few weeks since is no doubt disagreeable, but they say it is always darkest before the dawn.

"I should have liked you to hear our boy Herbert's singing. He has a sweet voice, and sings all kinds of little songs of his own composition, sometimes quite musical and in form, but hitherto we have not been able to get him to *learn* a note of the piano or of any regular song. He has even no idea yet of singing with the piano, yet I cannot help thinking he has considerable musical tendency; and the question is whether to leave him to educate himself at present."

In October the *Studies in Deductive Logic, a Manual for Students*, was published. The book was intended for the use of those students who, having gone through the *Elementary Lessons in Logic*, desired facilities for a more thorough course of logical training. In the answers supplied to many of the questions it contains much original matter; but a large part of it consists of exercises and examples requiring answers. In the preface Mr. Jevons explains why he adopted this plan. "The great point in education," he says, "is to throw the mind of the learner into an active instead of a passive state. It is of no use to listen to a lecture or to read a lesson unless the mind appropriates and digests the ideas and principles put before it. The working of problems and the answering of definite questions is the best if not almost the only means of ensuring this active exercise of thought. . . . In spite of much popular clamour against examinations, I maintain that to give a clear, concise, and complete written answer to a definite question or problem is not only the best exercise of mind, but also the best test of ability and training which can be generally applied."

Mr. Jevons had not returned from the seaside as much improved in health as he expected to be, and this was the more disappointing because he had derived less benefit

from his tour in Norway than in previous years. After resuming his full work for a week or two, it was plain that he could not continue it through the winter, and this led him reluctantly to decide to resign his professorship at University College, and also to ask leave from the Council to find a substitute to lecture for him during the current session. Only those, perhaps, whose nerves are exhausted from overwork as his were, can understand the burden that a fixed engagement was to him—a burden which to others would appear quite disproportionate to the amount of work involved. But his health was so variable that whilst he could get through a fair amount of work in the quiet of his own study, working at the times which suited him best, he often felt quite unfit to meet his class at the appointed hour. The subject, too, upon which he happened to be writing engrossed his thoughts so much that he felt it an effort to turn his mind to his lectures; he could not, he said, pass from one subject to another with the same facility as in his younger days.

He wrote to his brother Tom, who was on the point of returning to New York with his family :—

". . . I have been a good deal upset the last few days about the professorship. It is impossible to relinquish the employment of eighteen years without some perturbation of spirits, and when I introduced my deputy to a well-filled class-room I had some pangs of regret. But I am nevertheless sure that the step was not only wise but indispensable. It is quite impossible for me to go on with trying fixed duties when I have so much literary work on my mind. People in general are probably quite unaware that you cannot control or moderate work on a large book, because the contents are in your head, and cannot be got rid of except by writing them out. Thus every obstruction to the delivery aggravates the burden. However, in the course of two or three years I hope to have ready a very novel and complete treatise on Political Economy, which will elucidate most of the ins and outs of trade and industry.

"As my London examinership terminates practically in six weeks' time, I hope to be vastly more free for the future. . . . I fully intend to go about a good deal, and shall

often go to the Crystal Palace for the Saturday afternoon concerts."

To the Rev. Robert Harley.

HAMPSTEAD, 15*th November* 1880.

"Thanks for your suggestion about the possible infinite number of exceptions. You are obviously correct, and I will introduce your remarks if we ever come to a second edition, which I fancy we shall do in a little time.

"I am very sorry to hear that M'Coll is so ill. I fear his lot is not a prosperous one. As regards my resignation, you will perhaps feel it difficult to understand what a millstone upon my health and spirits the work of lecturing has been. Sometimes I have enjoyed lecturing, especially on logic, but for years past I have never entered the lecture-room without a feeling probably like that of going to the pillory. Now that I have been able to get rid of the burden I shall probably be much better. I shall never lecture, speechify, or do anything of that sort again if I can possibly help it. Apart from special reasons, too, I find that the pressure of literary work leaves me no spare energy whatever. Besides the *Logical Exercises* just finished, I have a large treatise in political economy in full progress, a bibliography of logic in hand, the analysis of *Mill's Philosophy* on my mind, a student's edition of the *Wealth of Nations* in preparation, besides a new edition or two, and various minor articles and things of that sort. It may seem impossible and absurd to attempt so much at a time with any advantage, but the fact is, it is difficult if not impossible to help it. You will easily see that under the circumstances it is much the most wise thing to throw up all interfering engagements as far as possible. Of course I suffer a loss of income, though less than might be supposed, as the professorship only yielded about £70 a year. This will perhaps, too, be made up to me in time, as my books occasionally pay some profit, though little compared with the labour they cost.

"By the by, I had intended to introduce, with your permission [in the *Studies in Deductive Logic*], Stanhope's syllogistic table as a kind of logical puzzle, but it was eventually crowded out with other matter, which I am keeping either

for a future new edition or for the bibliography. I intend the latter to form a kind of guide to the materials for a history of logic in recent times."

To H. S. Foxwell, Esq.

ATHENÆUM CLUB, *30th November* 1880.

"I ought to have answered your previous interesting letter, but unfortunately I have not yet overcome the pressure of examinations and other matters, and I find I cannot undertake anything like prompt and regular correspondence; my health has been so distinctly worse during the summer and autumn that I thought it best to take a decided step about the professorship. With the doctor's help, and freedom from harassing engagements, I hope soon to be more up to par, though I can never again be really strong as I was ten or twelve years ago.

". . . I am glad to hear you are getting on with the *Adam Smith.* I have just got rather over head and ears in the history of Political Economy in the eighteenth century, and hope to have an article soon ready, which may interest you, upon the Mr. Cantillon who is quoted by Smith."

To his brother Tom.

HAMPSTEAD, *5th December* 1880.

"It is excessively kind of you to have rushed in at the right moment and bought me those interesting old notes, which are a most important addition to my collection. They must be an almost if not quite unique lot, and added to the previous American and other notes make such a collection as probably hardly any one else has. I was much pleased also to hear that you were comfortably and prosperously settled.

"I have not been very happily engaged of late; my resignation of my long-accustomed work of lecturing being a thing which could not be effected without some regret and dejection of spirits. Moreover, I have come unwillingly to the conclusion that my health is really suffering. . . . I am now quite up to the writing point, and I have nearly completed the series of heavy examinations which oppress me at this time of year.

"My *Deductive Logic* has been decidedly successful,

I think, 572 copies having been sold in the first month, whereas only 800 or 900 copies of the *Elementary Lessons* were sold in the first two months, though at nearly half the price. The book has been rather favourably reviewed by the *Athenæum*, but I have not yet seen any other notice of importance. However, I find myself pretty well independent of Reviews.

"Of late I have been completing an article for the *Contemporary* of January, on a curious point in the history of Political Economy. Now that I am fairly launched on a purely literary life, I hope I shall get into a method of steady but moderate work. I fancy that the excitement and pressure of lecturing and other engagements often did me great harm.

"Our children are very well and happy. We had a fine run on the Heath this afternoon."

Now that Mr. Jevons had fewer engagements in town he was able more frequently to indulge in country walks, in which his little son was his constant companion. There never was a stronger friendship between father and son. The boy loved nothing so much as to be with his father, who had been his kindest playfellow in infancy, and was now the wisest and best of teachers. He gave no set lessons, but during their walks he was always ready to answer his boy's questions, and by pointing out to him anything of interest on the road that the child could understand he greatly quickened his powers of observation.

To H. S. Foxwell, Esq.

HAMPSTEAD, *5th December* 1866.

"Would it be giving you too much trouble if I were to ask you to look into the Cambridge University Library and examine whether they have got the following books:—Philip Cantillon, *Analysis of Trade*, London, 1759, 8vo; *Essai sur la Nature du Commerce en Général, Traduit de l'Anglais*, London (Paris), 1755, 12mo (ascribed to Cantillon)?

"I am writing an article on them for the *Contemporary*, which will, I hope, give you a high idea of their interest, and as Cantillon is one of the few quoted by A. Smith, the

search will probably be well worth making with regard to your own literary work.

"I have copies of the books, but so far do not know of any other copies in the country; and if they are in Cambridge I should like to mention the fact. . . . If there are any other entries in the catalogue connected with the name of Cantillon, or Philippe de Cantillon, they might be of interest; but I have already searched out almost every available item referring to him."

To his brother Tom.

ATHENÆUM CLUB, *8th January* 1881.

"Thanks for your letter recommending me to read the article of Dr. Brunton, which I will do as soon as I have found the periodical. I believe it is in the London Library.

"We are pretty straight now at home, baby having quite recovered from a rather sharp attack, which made us uneasy for a day or two.

"In the January number of the *Contemporary* you will find a rather long article of mine on a point in the history of Political Economy. I am now hard at work on an article on 'Free Libraries' for the next *Contemporary*.

"About 800 copies of my *Studies in Deductive Logic* were sold to the end of the year, which is more than half the edition of 1500. About 260 of these went to America.

". . . I had a very pleasant run about the Heath with Herbert and Winn for about an hour this afternoon, and then came to dine here and go to the *Damnation of Faust*, which Hallé is giving over and over again at St. James' Hall with much success. Dinner ready!"

To E. J. Broadfield, Esq.

HAMPSTEAD, *27th February* 1881.

"Just a few words to say that my wife and I went last night to hear Hallé's performance of Berlioz's *Childhood of Jesus*, and were much charmed with it. The shepherds' hymn is one of the most exquisite things I have heard for a long time, and all through the work there are marvellous touches of musical fancy and skill. I heard the *Faust* some weeks since, and was much excited and surprised by it—much

more so than by any music I had previously heard. His music is evidently somewhat inspired by such works as Beethoven's *Pastoral Symphony*, the *Engedi*, and other early programme music; but for my part I never felt any objection to programme music. The *Pastoral Symphony* especially, has been a source of ever new pleasure to me for a quarter of a century, so old are we now growing. The *Faust* is certainly a daring composition; but still I venture to think it is music, and the melody is every now and then delicious. I hope to hear more of Berlioz's music by degrees. I am now so comparatively free that I hope to hear a large part of the novelties in the way of music.

"We should be much pleased if you would visit us on your next journey to town and stay a few nights. 'Boy' is constantly pleased with *your* book, as he calls it; and I should like you to see our bonny little ones, the third quite promising as well as the other two.

"Mrs. Jevons and I are probably going away for the next ten days for a little relaxation after the fatigues of the winter, and before the coming exertions of the spring.

"I am deep in my large treatise and various other inquiries."

To his brother Tom.

ATHENÆUM CLUB, 17*th March* 1881.

"I was much pleased to get your recent letter, and learn that you were so cheerfully and pleasantly employed.

"It was a mistake not to tell you that I had heard Berlioz's *Damnation de Faust*. It not simply pleased me, but surprised and excited me more than any music I had previously heard. It was a complete revelation of new musical power. The Sylph's ballad I had previously heard at the Crystal Palace, and I considered it to be, especially in the few last notes, almost magical. The Amatory duet is the most intensely-feeling piece of vocal music I know. Lately Hallé brought out the *Childhood of Christ* at St. James' Hall, and I took Harriet to hear it. Though not nearly so striking as *Faust*, it has passages of great beauty, and the 'Adieu des Bergers' is permanently running in my head.

"Two nights ago I went to a concert of Lamoureux, the late conductor of the Grand Opera, Paris. We had three hours of almost entirely new music, some of it fine and delightful. A duet of Berlioz, a nocturn, struck me as exquisite and original in a high degree; the orchestra keeping up a low humming and chirping to represent the sound in the woods at night, in apparent independence of the melody. A man who could strike out such original ideas must have been a great musical and poetical genius; but his history was a sad one on the whole. I am thinking of getting some of his books to read. . . .

"We are in a state of prolonged crisis in England and Europe at present. To-day it is reported that an attempt was made to blow up the Mansion House last night, and the nerves of the old gentlemen of the Athenæum seem to be slightly shaken by the news. I am busily engaged in various inquiries. This morning I went to Somerset House and finished my search for the wills of the Cantillon family. I have found those of both Richard and Philip. I have an article on hand about 'Museums' for the *Contemporary*, and am thinking of printing a volume of collected essays before the end of the year. I have also engaged to write a book on *Trades Unions* for a series of Macmillan's.

"Harriet and I recently took a week's tour to Brighton, Lewes, Canterbury, and Tunbridge Wells. I think Harriet enjoyed it much, especially Canterbury; but the weather was very unfortunate, and I was not very well. While we were away, John and Lucy came to Hampstead and took care of the children. They like the opportunity of seeing them by themselves, I think, and 'Boy' and Winn took to them greatly. The children are getting on very well, and 'Boy' is much engaged in making boxes."

To his brother Tom.

HAMPSTEAD, 18*th April* 1881.

"I was much pleased to get your letter a few days ago, and to learn that all was well with you. We are getting on fairly well. . . . I am myself, indeed, far from being so well as I could wish, but I propose to take life very quietly for the future, and with care in diet hope to improve. I have

just written this morning the first few pages of the finished draft of my treatise on *Economics*, but the main part of the book is hardly more than sketched out, and I hardly like to think of the years of work it must yet take before being completed.

"On Saturday I am going to take Harriet to hear Berlioz's *Faust*—her first visit. I shall be curious to know whether it strikes me as much as at first. About a week ago we went to hear his *Romeo and Juliet*, and there was much beauty in it, as well as in the rest of the very long concert. But neither *Romeo* nor the *Childhood of Christ* have the startling power of *Faust*. I hope to hear a good deal of Wagner this spring under Richter's conducting. . . .

"Many bubbles are now being put forth in England, and they will probably increase very much in the next few months, but I do not think there is any ground for a crisis just yet. It will take a year or two for the investment in their companies to tell upon the abundant free capital of the country.

"We have now apparently got safely through the Fenian plots and other difficulties, and I hope that Gladstone has succeeded in steering into smoother waters. His spirit in making peace with the Boers was wonderful."

To J. L. Shadwell, Esq.

HAMPSTEAD, 26*th April* 1881.

"I have read your impressions of Italy with much interest. It is curious how much you were able to understand and appreciate of what you could not see. It is a matter of regret, however, that you do not appreciate music. To speak of instrumental music as noise is extraordinary to me. The world of sound is almost more enjoyable to me than the world of sight, and the loudest orchestra, if only it be harmonious and play good music, has a kind of constant organic pleasurable effect. The only drawback with music to me is that, when very good, it produces so much interest and excitement as to pass from a recreation to a cause of exhaustion. I wonder what you would think of Berlioz's *Faust?*—a wonderful work."

To J. L. Shadwell, Esq.

HAMPSTEAD, *6th May* 1881.

". . . I cannot think Bach's *Passion Music* well adapted for pleasing a person supposed to be non-musical. It contains, no doubt, music of a very high type, but such as only recently has begun to be appreciated. *La Favorita* is at the other end of the scale, at least so I should suppose, never having heard it (nor having any intention of hearing it). I should fancy that ballad-concerts, or miscellaneous concerts, would suit you best, and I can hardly doubt that if you frequently attended such concerts for a year or two, you would eventually derive great pleasure from them. The love of music is a thing which can be cultivated and indefinitely increased from a very small germ, and though I suppose there really are people devoid of that germ, I can hardly believe that you are one of them."

To his sister Lucy.

HAMPSTEAD, *14th May* 1881.

"I must write a few lines to wish you many happy returns of to-morrow. My memory for birthdays is indeed so bad that I should hardly have been likely to remember it had not the children been so very busy preparing you surprises. I hope that Herbert's remarkable letter will reach you safely. It has been the result of very anxious care on his part and of some little trouble on my part.

"I have been on duty now with the children for three days, while Harriet was away, but am thinking of dissipating a little in town now. I have not even seen the Academy. I sent you a day or two ago a copy of the *Contemporary*, with my article on 'Bimetallism.' After you have quite done with it I shall be glad if you will post it back, as I like to have a spare copy of articles. I also sent you a copy of the *Biograph*, with my 'Life' in it. The article is little more than a reprint of what appeared in the *Owens College Magazine* shortly after I left Manchester, having been written, I believe, by my successor Adamson. Please keep this. I am writing pretty steadily at my large book on *Political Economy*, and it absorbs all my strength and almost all my thoughts just at present. . . ."

To H. S. Foxwell, Esq.

HAMPSTEAD, 17*th May* 1881.

"I only heard yesterday at college that the Council had finally appointed you my successor. . . . I have now the pleasure to hand you the key of office, being the key of a drawer in the professor's room, marked No. 6, where you may keep any papers or other articles you need. . . . There is in the professor's room a large roll of diagrams, chiefly consisting of illustrations of my statistical papers. They are of no further use to me, and if not preserved by you must go as 'waste.' Before they are destroyed you may as well look at them and see if they are ever likely to be of use to you. Considerable use might be made of diagrams in political economy, but I never had energy enough to carry the use far. Now lecturing is a thing of the past with me, I regret in some ways the laborious and sometimes exciting and pleasing hours I have had; but my nervous framework was not made for the platform.

"I am making nice progress with my large work on *Political Economy*, as far as my health will allow. I was sorry not to be at home when you called. I hear of you at the booksellers' occasionally, and fancy you must be getting a good collection of economic books.

"I have given up all hope of cataloguing my books, and trust to my memory and sight, but if I could work for longer hours I should much like to make a card catalogue."

By "the booksellers" referred to in the preceding letter Mr. Jevons meant two or three second-hand book shops which he often visited, for the improvement of his library was one of his greatest pleasures. When he removed from Manchester he took with him a great many books; but, with the increased facilities for procuring them in London, they rapidly increased in number until they amounted to several thousand volumes, including some very rare and curious old works on economic and other subjects. On a leisure afternoon he thoroughly enjoyed making a round of several old book shops, and his kindly, courteous manners—as courteous always to his inferiors in position as to those of his own station—were fully appreciated by the owners. At two at least of the shops which

he most frequented he was regarded as a friend, and the booksellers took a pleasure in looking out at the sales they attended for the books they thought might suit him, reserving them from their other customers until he had seen them.

To John Mills, Esq.

HAMPSTEAD, 19*th May* 1881.

"Thanks for the copy of your letter on Bimetallism, which I have read with much interest. It is a strong and pointed argument against Cernuschi and his school. I had not seen the letter before, and if you sent me an *Examiner* I must have accidentally failed to notice the letter.

"Grenfell's extract is probably quoted from Giffen's paper in the *Statistical Journal*, March 1879, vol. xiii. pp. 36-68, an important paper, but I have not found the precise passage.

"I do not think the subject of Bimetallism is worth much powder and shot. The whole thing will collapse at the next meeting of a conference. My own impression is, that the French Government are heartily sick of their double standard, and are putting up Cernuschi that they may conveniently recede under cover of his absurdities.

"As to coal, I certainly made a mistake of six months, and I have had some unhappy half-hours over some of my shares, but I do not plead guilty to more than six months' error as yet. There is a great future coming. Moreover, the Coal Question is going to be verified in a manner which no one would have believed. With coal so cheap, and pits working half time, the output is only some twelve millions behind the calculated amounts, or about 8 per cent, which will readily be made up in a single brisk year!"

During this year Mr. Jevons had contributed three articles to the *Contemporary Review*. To the January number, "Richard Cantillon and the Nationality of Political Economy." To the March number, "The Rationale of Free Public Libraries." To the May number, "Bimetallism."

In July he also contributed an article on "Symbolic Logic" to *Nature*.

Feeling more than ever that his private work was as much as his strength could bear, he had resigned his

post as vice-president of the Statistical Society during this spring.

To his brother Tom.

BULVERHYTHE, HASTINGS, *8th July* 1881.

"I was pleased to get your cheerful letter some weeks since. I was so much below par, and so occupied with examinations and other matters, that I could not well answer before. We are having a quiet holiday here, and for the first four days of our visit enjoyed delightful weather. Then came a heavy thunder-storm, lasting the greater part of the night, and now we have cool winds. The children are very well, and enjoy grubbing about the shore very much. Harriet is also enjoying herself fairly, but seems to feel maternal cares. I am in an extraordinary weak state, and was quite knocked up the other day by walking to St. Leonards and back, two miles each way. I sleep quite twelve hours out of the twenty-four, which seems to do me more good than anything else at present. I have now written to take passage by the *Domino* to Bergen on the 26th July. Will will be my companion for a part of the trip. . . .

"After my holidays I have to write a brief popular book on *Labour* for Macmillan, and then I hope to have a clear fling at my large *Political Economy*. The attempted assassination of the President created a great sensation in England. We have, of course, all particulars here in the papers, besides telegrams in the St. Leonards News-room when I can get there. One can imagine the Emperor of Russia saying to himself, 'Ah, it is not only we autocrats that get shot! . . .'

"The census reports in England, together with the coal statistics, are wonderfully bearing out my *Coal Question*, and my opponent, *Price Williams*, finds the ground entirely cut from under him. Possibly I may next write to you from some retreat in Norway."

On the 20th July he wrote to his sister Lucy:—

"We leave here early on Friday morning, so that our address will now be Hampstead.

"I have taken a passage for Norway in a boat leaving on Tuesday 26th. Will accompanies me a part of the time, and I shall probably go and stay with Arthur and Kate, but have formed no definite plans.

"We have enjoyed our visit here very much, the weather being so splendid and the long evenings enjoyable. The children are in a high state of health, especially Herbert, who is the picture of health. Winefrid was a little upset with the heat one day, but is quite well now, and looks very pretty running about the sands with her bare feet. Everybody has bathed more or less, but the children have very peculiar ideas on the subject.

"I think I am a good deal better, but need plenty of rest yet before I am really well."

To Professor Lèon Walras.

20th July 1881.

"I have received with much pleasure the copies of your two memoirs which you have been so kind as to send me. They both treat of subjects interesting to me, and I hope in a little time to study them carefully. I am at present, however, taking relaxation for the improvement of my health, and in a few days I leave home for Norway, to spend five or six weeks there perhaps. My recent application to study has a good deal injured my health, and I have on this account resigned my professorship of political economy at University College. . . .

"I have been making considerable progress with my large treatise on *Economics*, which will go over the whole field of the subject. I have also promised to write a small popular treatise on the subject of *Labour*.

"In a former letter you told me you had learned some particulars of the life of Gossen. I wish that you would either publish these yourself, or send me the facts that I may publish them, in your name, in some English journal.

"I regret that I am so bad a correspondent, but my strength is over-taxed by the work I have on hand.

"I am glad to say I think the mathematical view of economics is making much progress in England, and is fully recognised by those competent to judge."

To his Wife.

SWEBY'S HOTEL, BERGEN,
Sunday Morning, 31st July.

". . . We have not been very lucky since leaving Lon-

don. The delay of the steamer for twelve hours was not only vexatious in itself, but has caused us to stay forty-eight hours in Bergen, where the pressure of travellers obliged us to go to a hôtel which I should call very second-rate, were it not that it is about as comfortable as the supposed first-rate ones. It is kept by an intelligent Norse captain of a steamer. Then the passage itself was a *miserable* one. Everybody agreed about that; although the sea was not very rough, the ship pitched so that every passenger, with a single exception, was seasick, and many of them dreadfully so. . . .

"We got into Stavanger about 12 at night, and stayed there seven hours. I landed with Will and walked about the town for a time, and then slept as well as I could with the steam crane going. . . .

"It seems that this is a rainy season in Bergen and the west coast. It has been raining for some six weeks here, and still continues to do so at intervals in a sort of steady dreary way which does not suggest leaving off. However, we go aboard the *Kong Karl* for Molde this evening. . . .

"Yesterday was a very busy day in Bergen, and I never saw the fish market so full or the Strand Gade so lively.

"I have been in four of the churches of Bergen this morning, including the Roman Catholic and the Baptist. I do not think the Lutheran Church need be afraid of the Dissenters. I have also been to the band in the park, which played in spite of the steady rain. Tell Herbert and Winn that there were a great many little boys and girls listening to the band all in the rain, without umbrellas, and the girls without hats or bonnets. They listened very quietly, and not like the children at the Hampstead band."

On the 2d August he wrote again to his wife from Molde:—

"We have now got on a stage since I posted my last. The voyage from Bergen, however, has been a dreadfully wet one—almost continual rain—sometimes pouring, and in the latter part a gale of wind. . . . I had hoped to get into Molde at 2 A.M. this morning, but we were rather late in reaching Aalesund, and when the ship was ready to proceed, in the middle of the night, it was blowing and raining so

hard that the captain seems to have delayed departure, and we did not finally get to this hotel till between 7 and 8 A.M.

". . . Will continues to be creditably jolly, but so far I can hardly claim the like.

"I hope to hear this evening that you and the children are quite well. I want sadly to be back with you again, and though, I suppose, I must undergo three or four weeks more of this travelling, I cannot pretend to enjoy it as I formerly did when travelling with you.

". . . Hearing that two Englishmen had been drowned at Molde, I thought you might possibly meet the statement in an English paper and be alarmed lest it should be Will and I, as the time nearly corresponded, I therefore telegraphed from Naes instead of Bergen as I had intended."

After writing the preceding letter Mr. Jevons went on to Stueflaaten in the Romsdal to join his cousins, Mr. and Mrs. Arthur Jevons; he spent about a week with them, and then took the Gudbransdal route to Christiania by himself, returning home somewhat sooner than he had intended. Norway had by this time lost its novelty for him, and the weather having been so bad during the first part of his tour, and his health having made him unfit for much exertion, he had not enjoyed his holiday there as he formerly did. After a few weeks at home he took his wife and family to Malvern Wells.

To his sister Lucy.

STONELEIGH, MALVERN WELLS,
Monday, 26th September 1881.

"We got here in pouring rain on Saturday, but yesterday it turned out fine, and we had a beautiful view from part of the hills, which we all, excepting baby, ascended without difficulty.

". . . A curious discovery which I recently made among my books will perhaps interest you. In looking over a series of volumes of pamphlets which I bought a year or two ago, I discovered that the first few volumes were collected by my grandfather Roscoe, and had lists in his handwriting; two or more subsequent owners had continued the series, and one had made a note about 'Roscoe,' which first drew my attention to the fact. I have only, however, got a

portion of the series, other volumes having been sold before I met with the set. The volumes include copies of some of W. Roscoe's own pamphlets. One of the subsequent owners was named Benson.

". . . Yesterday we saw some of the Welsh mountains in the extreme distance, and I fancy we could almost see as far as Rhayader. The Clee hills were quite plain."

To his brother Tom.

MALVERN WELLS, *2d October* 1881.

"It is quite time I wrote an answer to your and Isabel's pleasant letter of 28th August. Please thank Isabel very much for her addition to your letter.

"We have got moderately pleasant lodgings here, and the strolls over the hills in fine weather are very enjoyable. The children are in high feather, and find endless amusement with blackberries, wells, streams, and other peculiarities of the place. 'Boy' has walked with me to the top both of the Worcestershire and Herefordshire Beacons, which are at nearly equal distance, without showing signs of fatigue. . . .

"My health is, I hope, steadily improving after its long depression, and I have been able to write steadily for a few days at my new book on *Labour*, but I have to bear up as well as I can against depressing influences.

". . . In England there is no fear of a real crisis for many years to come. There will probably be ups and downs, but for the present a decided *up* is in progress. It is possible that, as in 1873, there may be an intermediate *check* rather than real collapse in 1883 or 1884, but there is no present prospect of any such thing. If peace be maintained there will probably be an unprecedented period of prosperity for the next seven years. I do not say that the same will be the course of events in the United States, for you move so fast that there may be an earlier check. But remember that the same causes which acted in 1873-74, namely, a breakdown of prices and rents inflated by the previous influence of paper money, does not now exist. I do not like the excited and violent tone of American politics, and the prevalence of 'corner' and extravagant speculation."

To his brother Tom.

HÔTEL DE NORMANDIE, RUE ST. HONORÉ,
PARIS, 30*th October* 1881.

"You will perhaps like to hear a little about the visit which Harriet and I have managed to pay here, leaving the children in the care of John and Lucy, who have kindly taken our places at home. We have now been here nearly two weeks, staying one night in Boulogne—where I wished to see a brother logician, an English tutor there resident—and another night in Amiens. We were very much pleased with the cathedral at the latter town. It is a charming work of architecture—perhaps the most beautiful church, on the whole, that I ever saw.

"Then after buying a few very cheap and valuable French books we came on to Paris, where we have enjoyed ourselves ever since. We have not been to the theatre at all, as I never succeed in finding the way into a French theatre, but we have had concerts, grand dinners, and above all, the Electric Exhibition. The latter alone was worth coming from London to see, being indeed the most beautiful and enjoyable exhibition I have ever seen—and I have seen nearly all the great exhibitions in London and Paris in and since 1851. The various rooms, lighted by different species of electric light, and the innumerable applications of electricity in all modes, are most interesting. We have spent four evenings in the building (the Palais de l'Industrie), and have by no means exhausted it. Yet it is an exhibition of moderate dimensions, and does not exhaust the visitors. They are going to try to repeat it at the Crystal Palace, but I do not think they can equal what the French have had the genius to originate. On three evenings we have dined at the Grand Hôtel, which you probably know. It is rather expensive work, but they are the most enjoyable dinners I have ever had, resembling first-class banquets, without any of the worry of speechifying or the ridiculous twaddle and etiquette of dinner parties. Properly speaking, I believe we ought (that is to say, musical people) always to dine to the sound of music; it produces a placid and exhilarated tone of body and mind, highly conducive to digestion and general wellbeing.

"A large part of my time has been taken up in book-hunting on the banks of the Seine. I have secured almost a trunk full of books on economics, of much scientific and historic value, but often at ridiculously low prices. I am going by degrees, rather fully into the history of Political Economy in France during the eighteenth century, and book-hunting is in the end the easiest and cheapest way of acquiring the means. We return home on 1st November. Do you remember our changing money at Piccadilly Circus at the rate of 24 fr. = £1? I went there and changed some at 25·20—the full rate!"

On the 3d November he wrote to his friend Mr. Foxwell:—

"I have just been on a book-hunting visit to Paris, and have returned with more than a hundred French economic works. I have met with the original editions of Vauban's *Dixme Royale*, Boisguillebert's *Detail de la France*, Le Trosne's works, and a few others, besides plenty of recent economic publications."

To Rev. Harold Rylett.

HAMPSTEAD, *6th November* 1881.

". . . Though there may have been much to sympathise with in the earlier efforts of the League, all my sympathy with the League ceased as soon as they began to work against the new Land Act. I look upon that Act as the greatest concession that could be made, and one which is a sufficient step towards setting Irish affairs right. Every real friend of Ireland will be found as a supporter of the action of that Act, and the new Court created by it. I do not mean to say that no further reforms are needed. There may be plenty to be subsequently done—the repeal of the Whiteboy Acts, the Consolidation of the Irish Railways, and a good many minor reforms. But these will follow, and they will not be hastened by the intense ingratitude to Mr. Gladstone shown by those who ought to have been his truest followers.

"There can be no doubt that for many years past the fondest hope of Mr. Gladstone has been to redress the wrongs of Ireland, and to restore her to all possible prosperity. If

he has made any mistake, it was in the decision of his Cabinet to endeavour to govern Ireland without any extraordinary powers. If I recollect aright, he allowed the Coercion Act of the Tory Government to lapse when he might have insisted on its re-enactment.

"The milder policy would probably have succeeded had good harvests occurred in the subsequent years. But the failure of harvests, and the rejection of the Eviction Bill, frustrated his efforts to maintain the milder course.

"I am sure that no one can possibly regret more than Mr. Gladstone the necessity of reverting to coercion; but coupled as it is with such a noble gift as the new Land Act (not to speak of earlier reform, such as the disestablishment of the Irish Church), I am quite unable to understand how you can be found among his opponents.

"Thanks for the copy of Henry George's pamphlet on the 'Irish Land Question.'

"I have already got his book on *Poverty*."

To his brother Tom.

HAMPSTEAD, 12*th December* 1881.

"I was much pleased with your last letter, written soon after your return home. It showed you to be well and happy, with plenty to do. The geological discovery was well worth making, and in America there must be much more field for such things than in this well-scanned country.

". . . Our little ones are all quite well at present, I am glad to say, and 'Lucy Cecilia' has just begun to walk about the room. She is a cheerful, happy little thing, and completes the trio nicely.

". . . I have been working under pressure for a week past, to finish an article for the *Contemporary* on 'Married Women in Factories.' It treats of infant mortality, and I hope you will like the view it takes.

"I am getting towards the end of my book on the *State in Relation to Labour*, but it involves a great deal of reading and thinking.

". . . I want to get on with my large book on *Economics*, which will never be finished if I take up every task offered.

"I am also intending to bring out a reprint of all my principal articles and papers on Money, etc., under the title, *Investigations Concerning Currency and Finance.* I hope that it will make a nice volume. You see that I have plenty on hand, but I often feel very unequal to it.

". . . I am just going to buy a new piano, but am much perplexed between the makers, who are all so good."

Mr. Foxwell having expressed a wish that Mr. Jevons would visit him at Cambridge, he had thus written on the 4th December:—

"As far as I can possibly tell at present, I think I could be with you for one night, namely, that of the 19th December, which, I understand, would suit you; but please do not put yourself out of the way; a few hours' quiet chat with one or two fellows is all my nerves can stand just now. I hope they will some time or other be better."

Before his visit to Cambridge Mr. Jevons spent two nights at Ely, and afterwards went on to Yarmouth to visit Mr. Inglis Palgrave.

To his Wife.

LAMB HOTEL, ELY, *18th December* 1881.

"I had an easy journey down yesterday, and find everything here comfortable and quiet. I wish I could get you to come here. It is in many ways the most striking of all the cathedrals. The weird-looking western tower and the long solemn Norman nave contrast so finely with the central octagon dome and the lovely chancel. However, it is no good attempting to describe such things, and you must come and see them.

"This morning they had an ordination service, beginning with a sermon and ending—so far as I was present—with the laying on of hands by the bishop. There was not much music, excepting a nice introductory from Mendelssohn. But I was interested in the ceremony of ordination until the bishop began a long address, which I understood would last till 2 P.M. Then I went to dinner, nearly all the congregation having gone previously.

"This evening at 4 P.M. we had a very pleasing introductory voluntary, probably by Handel, an anthem by Purcell, as enclosed, which was exceedingly sweet in parts,

with symphony interspersed, and then, after an altogether sweetly-sounding service, the organist played the most beautiful piece of Wagner, I rather think a part of the March from *Tänhäuser*, which produced the best possible effect on the organ.

". . . There is an air of repose about these old places which suits me exactly."

To F. Y. Edgeworth, Esq.

HAMPSTEAD, *26th December* 1881.

". . . I have read your remarks on capital with care and interest; you will excuse my saying that you seem to be still deep in the fallacies of Mill. I fear you have not yet approached to a comprehension of my theory of capital as involving solely the element of time. I now see that the whole theory of the matter is implied in the expression for the rate of interest as given on p. 266 of my 2d edition [*Theory of Political Economy*]. Some of my other expressions may be misleading. Indeed, as long as you speak of 'capital' instead of 'capitalisation,' I think you are pretty sure to go wrong. However, the matter is too difficult to discuss in a letter, and I hope in a short time to try and write it out more fully and satisfactorily."

To H. S. Foxwell, Esq.

HAMPSTEAD HEATH, *1st January* 1882.

"I find that I have Playfair's book *On the Decline of Nations*—a good copy, also the *Essai sur les Causes du Declin du Commerce*, 1757. Entirely at your convenience you can send the other books. . . .

"I enjoyed my visit to Cambridge as much as my weak state of health will allow. Unfortunately I suffer from neuralgic pains in the back, which generally come on when they are least wanted. I am getting my book on *Labour* nearly done. Then I have a collection of papers on Money on hand, and my large *Political Economy* looming faintly in the distance."

To the *Contemporary Review* for this month Mr. Jevons contributed an article, "Married Women in Factories," his

attention having been much drawn to the subject during the preparation of his book, *The State in relation to Labour.*

To William Crookes, Esq.

HAMPSTEAD, 24*th January* 1882.

"I thank you much for sending me a copy of your beautiful memoir on the viscosity of gases at high exhaustions. I am glad to be able to add it to my collection of your previous memoirs.

"You appear to make perfectly good your theory of the ultra-gaseous state of matter. Although there seems to be no absolute breach of continuity of the properties, yet ultimately the ultra-gas is as widely different from gas, as is that from solid.

"I am also interested in your logarithmic diagram."

To George Gore, Esq.

HAMPSTEAD, 11*th April* 1882.

"I thank you very much for the copy of your new book on the *Scientific Basis of National Progress,* which you have been so good as to send me. I have read it with much interest. It develops, very conclusively, the view which you had previously put forth more briefly, and it is impossible not to agree with you for the most part.

"I have, however, never quite made up my mind how far it would be practicable to extend *direct* endowment of research. That it is desirable and successful, with certain persons and in certain cases, there can be no doubt. But it is a question how far it could be provided for, incidentally as it were. However, it is too large a subject to discuss by letter, and I certainly agree with you on the whole."

To his brother Tom.

HAMPSTEAD, 19*th March* 1882.

"I have now received the two little clocks, which I found a few days ago at the Athenæum Club. They keep their rooms so hot in the winter that it does not suit my weakened health, and I have been seldom going there of late. I will give Josephine her clock the next time we go to Epsom, probably in a week or ten days.

"Almost worse than the clocks was the fact that I found a letter from the Prince of Wales, signed *propriâ manu*, inviting me to the meeting at St. James's Palace about the Royal College of Music. Not having known of the letter, I had neither gone nor returned the card nor sent any answer. However, I have now sent a polite explanation to the secretary, and a subscription of five guineas.

"I am just finishing the proofs of my book on *Labour* for the English Citizen Series. . . . The reprint of my papers on Money is also proceeding satisfactorily; but a great deal of work is yet needed to complete the book and introduction. I hope you will find it interesting when done.

"I think the Bimetallists have received a final blow in the sudden flood of gold from America. In fact almost all the commercial writers have their theories shattered by the sudden return of ease to the money market. I have never had any fear of a real pressure for the present. In England at least there is really no bad business worth speaking of, and where prices of stocks are high it is from excess of caution—people not knowing what to invest in, and therefore buying any safe railway stocks at whatever price they have to pay. The coal trade is rather disappointing at present, but it must mend by waiting; and I am getting five per cent on most of my investments. The iron trade promises well.

"I am almost in despair about Ireland, and I fear that coercion is a mistake. I told a member of the Government last September that the Government ought to grant an amnesty to the suspects on the day the Land Act came into operation (1st October). I believe that if they had taken some such course things would have gone very differently. Although the passing of the Land Act was a great feat of power, the management of Irish affairs has otherwise been unfortunate, and with all his good intentions I fear that Forster is hardly the kind of man to govern Ireland. Lord Dufferin or some man of that kind, with tact and geniality, is needed to influence the Irish."

To his brother-in-law John Hutton.

HAMPSTEAD, *19th March* 1882.

". . . A few days ago we took both 'Boy' and Winn to the Tower, where they were much pleased with the armour, jewels, etc. They were pleased also with the beheading axe, which did not seem to possess any disagreeable ideas for them. I have come to the conclusion that horrors of that sort have no existence for children."

To his brother Tom.

HAMPSTEAD, *30th March* 1882.

". . . I am feeling a little more free from work, having finished the proofs of my book on the *State in Relation to Labour*, and also sent to the printer the main part of the copy of *Investigations in Currency and Finance*. I am now going to make a new start with the large book on *Political Economy*. I find that gentle work agrees with me better than anything else, especially such interesting work as that of the large book.

"I have just had an offer of an examinership under the Civil Service Commissioners, worth £130 a year. I was also asked to examine at Oxford, but declined that and one or two other examinerships making nearly £200 for the year. My health will not stand the wear and worry of such work, and it does not even pay in the long run."

To his brother Tom.

HAMPSTEAD, *7th May* 1882.

"I have just heard to-day (Sunday), by rumour, of the dreadful murder of Lord F. Cavendish and another in Dublin. I fear it will immensely complicate a situation already nearly hopeless. I confess I doubt the wisdom of the course of the Government for some time back. I believe that conciliation should have been tried on the passing of the Land Act. Forster's speech of explanation on his resignation is generally blamed. . . .

"We have been for three weeks at our seaside retreat, 'Galley Hill,' where, however, we had unsettled weather and two severe storms. On the second occasion the sea was nothing but wild surf as far as we could see.

". . . I have completed the proofs of my small book on *Labour*, which is now left entirely in the hands of the printer and publisher. I am nearly half through the proofs of my reprint of papers on Money, but the amount of new work acquired will take six months to accomplish."

In spite of the stormy weather the spring wild-flowers were in their full beauty about Bulverhythe, and Mr. Jevons during his stay there began to teach his little son the elements of botany. Though want of time had prevented his making a study of botany in his mature years, he had always taken a pleasure in finding out the name of any flower new to him that he met with in his holiday rambles, and he now gave such clear and simple lessons as to excite his boy's interest in the subject at once.

To W. R. Grenfell, Esq.

HAMPSTEAD, *7th May* 1882.

"I should like to say how sorry I was not to be able to attend the meeting of the Political Economy Club when you brought the subject of Bimetallism forward. I have been far from well of late, and not able to go about to debates. For the same reason I should not feel able to avail myself of an invitation, even if you were to act upon the suggestion you threw out on Friday evening.

"I have been following the controversies on the subject with much interest, and am in fact busily engaged upon a volume, partly consisting of reprints of former papers, with a good deal of new matter, more or less bearing upon Bimetallism. So much labour is, however, required in completing the volume in the way I wish, and in seeing it through the press, that I cannot undertake to answer the numerous arguments put forward in the *Bullionist* and other publications. My own impression is that this question cannot be wholly 'laid,' and that it will recur from time to time in the future as it has in the past. But it seems to me requisite to draw a clear distinction between the speculative aspects of Bimetallism and the practical conclusion applying to us here and now in England."[1]

[1] See Appendix A.

At the beginning of June *The State in Relation to Labour* was published as a volume of Macmillan's series, "The English Citizen—his Rights and Responsibilities." This little book was the result of his maturest thoughts upon the subject; and the conclusion to which he came was, that no hard and fast rules could be laid down for the interference or non-interference of the State with labour; each case must be treated in detail on its merits. "Specific experience is our best guide, or even express experiment where possible, but the real difficulty often consists in the interpretation of experience. We are reduced to balance conflicting probabilities of good and evil."

To the Rev. Harold Rylett.

HAMPSTEAD, N.W., *2d July* 1882.

"Not having read Davitt's speech in detail I cannot speak of it, but I do not believe in nationalisation of the land. I am strongly in favour of any scheme tending towards peasant proprietorship, and would like to see the State risk a good deal of money on the enterprise. But the Government must not be the landlords. The people must be their own landlords as soon and in proportion as they can be made to be so; but of course I am aware of the great difficulties in the way. Anything is better than the present state of things. I do not think you need trouble yourself much about Bastiat's opinions in regard to land. They are not, in my opinion, well founded. I have not read George's pamphlet nor his book; but from glancing over the latter I am not inclined to take it up while so many better books are available.

"The remarks in the *Economist* on your letter were not written by me. Having shown your letter to the Editor in the course of discussion, he wished to print it as a text—and omitting your name I saw no reason to refuse.

"Being an economist and not a politician, I hardly like to venture upon the wide and stormy field of the Irish Question. There can, however, be little doubt that the progress of events tends to justify your position more than it was formerly easy to foresee. I never, indeed, believed in Forster's coercion policy, which struck at the wrong parties,

and was calculated rather to irritate than suppress or amend what was wrong.

"I may also add, that though I was formerly of the opposite opinion, both the course of events and the course of my studies have tended to suggest grave doubts as to whether the whole tendency of English agrarian law, policy, and practice is not radically wrong.

"In England the immense wealth and social power of the landowners has disguised the question, but it has broken out in Ireland, and it will break out sooner or later elsewhere. I have quite satisfied myself that whatever may be the economic results, the social and political results of an opposite agrarian policy are infinitely superior to what we experience. Some day I may perhaps try to write out these opinions and support them, but it is too heavy a subject to venture upon in a hurry."

To M. Luigi Bodio.

HAMPSTEAD, N.W., *4th July* 1882.

"I return my warm thanks for the beautiful volumes and atlas of the *Monograph of Rome and the Campagna*, which arrived safely a day or two ago. They will have a place of honour in my library, and are full of interest for me. Since the visit which I had the pleasure of paying to Rome and Italy about ten years ago, I have not ceased to feel a peculiar interest in everything relating to the places visited.

"I thank you also for the *Archivio di Statistica* and other publications safely received. I have found them very valuable of late, in connection with a work on Money which I am preparing, and of which I shall hope in a few months to forward you a copy.

"I welcome especially the contributions to a history of prices which I find in several places, including the article in the *Monograph*.

"I had the honour to forward you, a few days ago, a copy of my small book on *The State in relation to Labour*, which, though small, has been the object of much thought to me."

To his brother Tom.

GALLEY HILL, BULVERHYTHE,
NEAR HASTINGS, 19*th July* 1882.

"I am very sorry indeed that so long a time has elapsed since I wrote to you. The last two months, however, form the most busy and distracting time of year to me, and letter-writing is too much like my ordinary occupation to be relaxation.

"You will be pleased to hear perhaps that one of the distractions which took up much time this season was a full course of Wagner's music, which both Harriet and I enjoyed in a degree which we could not have anticipated. We subscribed both for the German opera season and the Richter concerts, and went out about three times a week. The concerts were good enough indeed. It was impossible that a hundred of the best German musicians, led by such an incomparably skilful conductor as Richter, could produce anything but the best music.

"Wagner's newer operas, however, produced as they were at Drury Lane, produced a wholly new impression, such as one will never forget. Having heard the *Flying Dutchman* much praised, I was a good deal disappointed with it, and even *Lohengrin* became thin and weak compared with what was to follow. *Tännhäuser*, however, which we heard twice, and would willingly hear a few times more, stands out as an altogether striking and perfect composition. It is impossible to forget either the 'Pilgrim's March' or the 'Siren Voices.' The *Meistersinger* proved to be a work of a totally different character, and having never before been performed in London, took the musical world there quite by surprise. On the first time of hearing, I was rather wearied by parts which are certainly long, however beautiful, but on a second and third hearing I became reconciled to the whole. The third act especially, in which the Guilds of Nürnberg assemble for the prize song contest, is a beautiful sight, sustained as it is by a continuous stream of music, such as Wagner only could write.

"We also heard *Tristan and Isolde* once, a work of an entirely different character again, being a kind of musical

tragedy, more, in fact, a kind of musical picture of the Arthurian knight and the unfortunate bride whom he was sent to fetch to the king. There are only some half-dozen characters in the whole, and hardly any chorus; but the manner in which Madame Sucher and Herr Winkelmann riveted your attention throughout a long evening was again a wholly new thing. The music was in the highest degree Wagnerian, and I have not retained a scrap of it in my head; nevertheless it was music which seemed to bind the whole story together into one absorbing and beautiful whole. Harriet says that she shall never forget the picture of the noble and faithful knight, and I shall not forget the picture of the love-torn maiden Isolde, as she sat upon the deck of the ship.

"Madame Sucher is in fact an incomparable actress, singer, and musician—all three combined in an almost unique manner. In the concert room she disappointed me, being stiff and almost harsh in the power of her voice. But in the theatre she was all life, and grace, and music such as one will not perhaps hear again.

"These performances made a great sensation in London, and I was glad to assist, at least by being present, at what I consider the complete triumph of true music and art over the wretched Italian opera. No doubt the English and Italian opera will die hard; and *Tristan and Isolde* was clearly above the comprehension of the London public as a general rule. But *Tännhäuser* and the *Meistersinger* charmed every hearer, and I think you may consider that the 'music of the future' has established its hold in England.

". . . We have now got down to our quiet seaside retreat, where we have a beautiful stretch of shore yet almost our own, and pleasant quiet lanes, and fields and bits of wood, where we can do as we like. At Hampstead you are summoned if you touch a wild-flower.

"Unfortunately Winn caught cold in one eye at Hampstead and has yet to be kept in the house, and the weather is unsettled and windy. But we hope that the children will be all as well as 'Boy,' who is in high spirits racing about the sands and constructing all kinds of edifices on the shore.

"I hope you got a copy of my *State in Relation to Labour*. I have as usual much on hand, but intend to take things as easily as possible for the future.

"We have the *Times* daily, and I am following the tragic events in Egypt with horror combined with interest. The Arab race are evidently preparing the way for their own complete downfall and eventual extermination, and we can only console ourselves that they are opening the way to a better civilisation.

". . . I am going to overthrow my critics on the Employment-of-Married-women question, having pretty surely ascertained, by a comparison of the census and Register-General's reports, that the mortality of children under five years of age is proportional to the percentage of women over twenty years employed in industrial occupations."

During the first week of his stay at Galley Hill Mr. Jevons wrote a little paper on "Reflected Rainbows" for the August number of the *Field Naturalist*, a small scientific journal published in Manchester; but the last paragraph of the preceding letter points out the subject upon which he was chiefly engaged. He was preparing a paper for the meeting of the Social Science Association, upon the "Employment of Married Women in Factories," and every morning, whilst at Galley Hill, he spent two or three hours in examining with laborious care the statistics of infant mortality in every county, and comparing them with the statistics of women employed in work from home. The results obtained for several towns of each county in England and Wales he copied out to be exhibited to the Association. His opinion, as expressed in the above letter to his brother, was "that the mortality of children under five years of age is proportional to the percentage of women over twenty years employed in industrial occupations," and he hoped to prove that his judgment had not been lightly formed, but was the result of a thorough investigation of the subject.

The sight of his own tenderly cared for little ones, whose health and happiness he watched over with almost too much anxiety, made him realise what the sufferings of these neglected infants must be; as he himself said that he never could have done if he had not had children of his own;

and he had their cause warmly at heart, but the very thoroughness of his statistical inquiries entailed an amount of labour which deferred the actual writing of the paper, so that it was unable to be made use of at the meeting of the Social Science Association.

Until this visit Mr. Jevons had always been particularly fond of Galley Hill, the perfect quiet of the place giving him that feeling of rest which he so much needed. But day after day the wind blew direct from the sea, and this did not suit his health. In little more than a week after the last letter was written he returned home with his wife, partly to see his doctor, and also to make arrangements for a tour in Switzerland which they contemplated taking together as soon as the children's stay by the sea was over. At the end of a week he felt better again, and home was so dull to him, and so unlike itself without his children, that he preferred to return to them. But after a few days the sea air seemed to have the same bad effect upon him; he looked far from well, and said that he was not equal to work,—an admission which he seldom made.

In preceding summers Mr. Jevons had bathed frequently whilst staying at Galley Hill; he was a good swimmer, but he was always cautious about venturing out of his depth. This year he had refrained from bathing on account of his health, but he was so fond of it that this was a great deprivation to him. On the morning of the 12th August, two or three days before the time fixed for their return home, he said to his wife, when they were on the shore, that he thought he might have one bathe before he left. Not thinking him well enough she dissuaded him, especially as the temperature of the water seemed unusually cold for summer, and he did not speak of it again. That afternoon he had a walk with his wife and two elder children along the shore towards Bexhill, returning by the fields, where he gathered bunches of honeysuckle to please his little girl. In the evening, in answer to his boy's questions, he talked to him for some time about the stars, explaining to him some of those wonders of the heavens that are within a child's comprehension. The next morning, which was Sunday the 13th, he joined his wife and children on the shore for some little time after

breakfast, and then returned to the house alone, not speaking of what he intended to do. Galley Hill is a cliff which stands out between two stretches of shore, and after being in the house a short time he went down to the beach on the side towards Bexhill, his family being on the opposite side of the cliff. A man at a neighbouring cottage saw him going down the cliff with a towel in his hand, and nothing more was known until some little boys saw him floating apparently lifeless on the water, and raised an alarm. A young man bravely tried to reach him but failed, being unable to swim, and a boat had to be procured. There seems no doubt that the shock of the cold water was too severe for his enfeebled health, and that it produced such an effect upon the weak action of his heart as to cause syncope and render him, after the first plunge, quite unconscious and powerless to help himself.

Of his loss to science and the world at large it is not for his wife to speak; of his loss to herself and to his children she cannot speak.

"Jevons," writes the Rev. Robert Harley,[1] "was a man as remarkable for modesty of character and generous appreciation of the labours of others as for unwearied industry, devotion to work of the highest and purest kind, and thorough independence and originality of thought. The bequest which he has left to the world is not represented solely by the results of his intellectual toil, widely as these are appreciated, not only in England but also in America and on the Continent of Europe. A pure and lofty character is more precious than any achievements in the field of knowledge; and though its influences are not so easy to trace, it is often more powerful in the inspiration which it breathes than the literary or scientific productions of the man."

"That Professor Jevons will be missed," writes the editor of the *Spectator* "as one of the profoundest thinkers of our time on the philosophy of science, no one who knows anything of his writings will doubt. Yet he had other qualities,

[1] Obituary notice in the *Proceedings of the Royal Society.*

not always found in men of science, which make his character as unique as his intellect. At once shy and genial, and full of the appreciation of the humour of human life, eager as he was in his solitary studies, he enjoyed nothing so much as to find himself thawing in the lively companionship of intimate friends. Something of a recluse in temperament, his generous and tender nature rebelled against the seclusion into which his studies and his not unfrequent dyspepsia drove him. His hearty laugh was something unique in itself, and made every one the happier who heard it. His humble estimate of himself and his doubts of his power of inspiring affection, or even strong friendship were singularly remarkable, when contrasted with the great courage which he had of his opinions; nevertheless, his dependence on human ties for his happiness was as complete as the love he felt for his chosen friends was strong and faithful. Moreover, there was a deep religious feeling at the bottom of his nature, which made the materialistic tone of the day as alien to him as all true science, whether on material, or on intellectual, or on spiritual themes, was unaffectedly dear to him."

The published writings of Mr. Jevons, large as the number is compared with the number of years in which they were written, represent only a part of his work. He had intended to publish a student's edition of Adam Smith's *Wealth of Nations*, omitting some portions of the book, but giving explanatory notes, and commencing with a long introduction on the history of Political Economy, for which he had collected notes. He had also notes prepared for at least three other books, which were only laid aside until his large treatise on *Political Economy* should be completed. One was the *Examination of Mill's Philosophy*, previously mentioned; another was to be a further development of his theory of the influence of the sun-spots on commercial crises; and the third he proposed to name the *Tenth Bridgewater Treatise*. As those acquainted with the *Ninth Bridgewater Treatise* of Charles Babbage would naturally suppose, he intended to show in this work the perfect compatibility of the teachings of modern science with religion. No one ever thought out this question more thoroughly for himself.

In the *Tenth Bridgewater Treatise* he would have fol-

lowed out the lines of thought indicated at the close of the *Principles of Science*. The materials are in too unfinished a state to make publication possible; but a few brief notes are given here as the best means of showing the religious opinions of his mature life.

"The very wish for immortality, the very protest which the mind makes against its own extinction, gives a presumption that all accounts are not here closed. Whence come these feelings of hope, of confidence in deepest despair, if they are not God-inspired? All else in nature is fairly and reasonably adapted to its end, and must be so adapted, and are the highest products of the course of time mere deceptions?"

"There has been mooted this serious question, Is not any prayer, is not any petition, tendered by the soul to its Creator, vain and useless when the course of events is irrevocably bound by causes and effects? Can any reasonable man ask that a mountain shall come to him? and is it not equally absurd that in a drought we should meet to pray for rain, and in times of over-abundant rain should pray for sunshine? A single ounce of air or water cannot be diverted from its appointed course without breaking through the framework of nature. The universe might be destroyed and recreated as easily as a leaf be made to fall otherwise than as predetermined causes make it. I must confess for my own part that to ask the Creator distinctly for any concrete object or service is not only vain and useless, but it is more—it borders on impiety. It implies an impeachment of His goodness and His wisdom. It is as much as to say that God has ordered things in one way and we think they should be otherwise. But are there no other petitions which we can make? Cannot we ask that God, instead of bending His course to ours, will bend our course to His?"

"A prayer should be no petition at all. It should express but the resolution of the mind to carry out——"

"It is the effusion of feelings which come we know not how, but which as they are, are not less certain than the blazing of a meteor."

"The human mind is the inexplicable spring of new thoughts, desires, hopes, and fixed determinations in which

the Creator works his latest Will. Why do we ever err? Why are not all as good as the best—nay, a hundredfold better? Who can avoid asking such questions in his heart? What theory, what doctrine, can give a sound and final answer? I do not believe that in our present state these questions can be answered. But is it necessary? Does the private soldier enter into all the designs of his leader? Does the dog know his master's thoughts and comprehend that he is rightly checked?"

"There have been writers who, however industrious, were shallow, for they thought that science could account for the course of history. They utterly failed to see that a nation as a whole is the most complicated of phenomena, because not only is each individual different from each other, but any one may act upon the whole in a manner wholly incalculable. Genius or ingenium means inborn powers, of which no one can give a further account. Every symphony of Beethoven was literally a new creation. It was not a mere discovery. It was not the mere discovery of that which was in nature before, and only needed examination. It was a product of man's thoughts and feelings without parallel in anything previously existing, and which, therefore, could not have been predicted by any science."

"The doctrine that we have descended from apes or higher mammals is only at first sight repulsive. On further reflection, does it not offer boundless hopes of future progress? Among the lower animals, indeed, is the bounded variety—that sameness that is truly hopeless. But man may possess genius. We know not whence it comes, but from the mysterious working of the Primary Cause. Nevertheless, there may arise among the tender nervous cords the thoughts which have not existed before. Where do we find an antecedent for the grand yet tender feelings of the Homeric poems, the mysterious insight of a Pythagoras, a Socrates, or a Plato, the science weaving powers of Archimedes, of Galileo, or of Newton, the high thoughts and beauty of a Raphael, and last, though far from least, the inspired melodies of Beethoven? Surely these are new revelations of existence. It is all very well for poets to speak of history as repeating itself. But it is only a parody of science to

attempt by a few rude generalisations to trace out regular laws for the development of so complicated an existence as a nation. Buckle referred the character of a nation to the climate and the soil of its abode. Comte held that nations advance through three distinct phases of intellectual conditions, and was enabled to predict that in the hierarchy of European nations, Spain would necessarily hold the highest place."

"Truly it becomes impossible any longer to suppose that the human race, which we only know, and still more any special fraction of the human race, are the sole care of Heaven. Those who know the limitless magnitude of the universe, as displayed to us in the heavens, cannot believe that all sentient life is restricted to this planet. Among the stars and nebulæ are extreme differences of constitution and condition, yet the general composition of the matter is similar to that which we can touch and handle on the earth. Elsewhere there exist the very same elements—carbon, oxygen, hydrogen, nitrogen—of which our bodies are composed. Among countless millions of worlds, where the elements of life exist, is it to be believed that nowhere but on this earth has life itself been created? It may be so, but in the total absence of evidence to that effect the probabilities tend vastly towards the other conclusion. Assuming that beyond doubt we are the creatures of a tender Providence, it would be a narrow and a selfish feeling that would prompt us to desire that there were not others who should share that care. While there may be lower creatures like those remote ancestors from whom we have doubtless descended, what forbids us also to believe that elsewhere life may have progressed, and individuals may have attained to an intellectual and moral perfection of which we can now form but a dim and solemn notion?"

"For my own part, I believe in more revelation than any narrow Christian *doctrinaire*."

"My veneration for Jesus is wholly founded on the heartfelt beauty of His teachings, and the manifest workings of a Divine Spirit in His life and works. The miracles I would believe if they were attested by evidence worthy of the attention of the scientific mind."

"Jesus had no need of signs but the deep sign of His own pure nature."

"So far should I be from denying the inspiration of a human mind that I should deny its exclusive occurrence in any age or country. Are not all high thoughts, all pure desires, the gift of God? Are not all hearts moved in more or less degree towards the good they would not otherwise have conceived?"

"I do believe that there spring forth from the human mind and heart—the feelings which science will never analyse—hope and trust and self-devotion."

APPENDIX A.

Letter from H. R. Grenfell, Esq.

8th May 1882.

In reply to your most kind letter of yesterday, I beg to say that I quite concur with you in saying that it is necessary to draw a clear distinction between the speculative and practical aspects of the Silver Question. The worst of all these questions is that those capable of reducing them to theoretical expressions are very often incapable of understanding what happens in business.

I served a sort of apprenticeship to Lord Halifax, as far as the parliamentary and political view of currency was concerned, but I always found it most difficult to explain what really happens in business to him. On the other hand, it is equally impossible for those whose whole minds are occupied with the daily search after a profit, which commerce is, to clear away irrelevant matter from a discussion which ought to be as clearly defined in its terms as a problem in Euclid.

Before you finish your labours now on hand, would it assist you to know what is really going on? I should like very much to impart to you what I know on this point, unless you are already in communication with those better informed than myself.

In order to get to practical work it seems necessary to avoid trailing hares across the paths of those seriously desirous of a solution. You will forgive me for saying that the proposition for the issue of one pound notes partakes of the nature of a hare.

Palgrave's proposition to discuss "Bank Money" is of the same nature. Likewise his assertion that it is a banking rather than a currency question. There seem to me to be three practical solutions:

1. To leave it alone.

2. To make gold the universal standard, leaving silver to be used as an inferior currency at the value settled in each country, and internationally at the price of the day.

3. To resort to bimetallism—that is, not necessarily for England to join in an agreement, but by offering such terms as would induce those interested to make an agreement.

No. 2 does not appear to me to differ in any essential point from No. 1.

Can you enlighten me as to whether it does, and if it does, to what extent? I ask you this because practically No. 2 is what is proposed by Lord Grey, C. Daniell, and numbers of "haute finance" people in many countries, whose opinions are of great importance, but who have not taken part in the written discussions.

To H. R. Grenfell, Esq.

HAMPSTEAD, 12*th May* 1882.

In answer to your very interesting letter, I may say that it would be a somewhat intricate matter to define exactly how your second proposition, pointing to a universal gold standard, differs from the first—that is, the present state of things. Practically there is so large—in fact, by far the largest part of the population of the world, who only use silver, and are too poor to use much if any gold, that I do not think a gold standard could be introduced in the next ten or fifteen years much beyond the present limits. I do not think that it is practicable or at present desirable to introduce a gold standard into India, so that I should be perfectly satisfied about making any concession in that respect for the next ten, fifteen, or even twenty years, but that seems to me to be all we have to offer if a one pound note currency be out of the question.

It comes to this, then, that as we have really nothing to give but what we should give without a conference, I do not see that we have any place there. We cannot prevent the other nations coining what money they like, and our currency is too well established to admit of alteration. In a short time I should like very much to know what is going on, and perhaps I may hope to have the pleasure a few weeks hence of calling on you at the bank, at some time convenient to yourself.

APPENDIX B.

MR. JEVONS' WRITINGS.

1856.

24th August.—Weekly meteorological reports begun in the *Empire* newspaper, Sydney. Continued without intermission up to the end of June 1858.

1857.

7th April.—"Comparison of the Land and Railway Policy of New South Wales."—*Empire.*

24th April.—"Meteorology of Australia."—*Empire.*

23d June.—"The Public Lands of New South Wales."—*Empire.* Reprinted in the Summary for England.

June.—Monthly meteorological reports begun in the *Sydney Magazine of Science and Art.* Continued till the end of June 1858.

July.—"On the Cirrus Form of Cloud, with Remarks on other Forms of Cloud."—In the *London and Edinburgh Philosophical Magazine*, having been communicated by Professor Graham.

August.—"On a Sun-gauge, or New Actinometer," with illustrations.—*Sydney Magazine.* Communicated by H. E. Roscoe to the *London Philosophical Magazine.*

1858.

January.—"On the Forms of Clouds."—*Sydney Magazine.*

April.—"On the Forms of Clouds."—An Abbreviation in the *London Philosophical Magazine*, 4th series, vol. xv. p. 241.

October.—"Remarks on the Geological Origin of Australia;" and also "Earthquakes in New South Wales."—*Sydney Magazine.* "Some Data concerning the Climate of Australia and New Zealand," six chapters, fifty-two pages, 12mo.—Published in *Waugh's Australian Almanack* for 1859.

1859.

March.—"Meteorological Observations in Australia."—*Sydney Magazine.* "On the Semidiurnal Variation of the Barometer." *London Philosophical Magazine.*

November.—"Remarks on the Australian Gold Fields."—Read by H. E. Roscoe before the Manchester Philosophical Society, 15th November 1859, and printed in the first volume of the third series of their *Memoirs*, with illustrations.

1861.

July.—"Light and Sunlight."—Article in the *National Review.*

September.—Series of seven articles in the *Manchester Examiner*, relating to the Meetings of the British Association.

"On the Deficiency of Rain in an Elevated Rain-gauge as caused by Wind." Read by Professor R. Clifton before the Mathematical and Physical Section of the British Association, and printed in *Philosophical Magazine* for December.

Written January to August, and published in the course of the work, the following articles in the *Chemical Dictionary*, edited by H. Watts:—"Balance," "Barometer," "Cloud," "Gold Assay," "Hydrometer," "Hygrometer," "Thermometer," "Volumenometer."

1862.

April.—Article on the "Spectrum."—*London Quarterly Review.*

June.—Diagram showing all the weekly accounts of the Bank of England since 1844, with the circulation and the bank minimum rate of discount. Diagram showing the price of the English funds, the price of wheat, the number of bankruptcies, and the rate of discount monthly since 1731.

July.—Notice of Kirchhoff's Researches on the Spectrum.—*Philosophical Magazine.*

September.—Read before the F Section of the British Association, at Cambridge: (1) "Notice of a General Mathematical Theory of Political Economy;" (2) "On the Study of Periodic Commercial Fluctuations, with five Diagrams."

1863.

16th April.—*A Serious Fall in the Value of Gold ascertained, and its Social effects set forth, with two Diagrams.*

18th December.—*Pure Logic, or the Logic of Quality apart from Quantity, with Remarks on Boole's System and on the Relation of Logic and Mathematics.*

1864.

March.—Notice of Kirchhoff's second Memoir and Map of the Spectrum.—*Philosophical Magazine.*

12th March.—"Statistics of Shakespearean Literature."—*Athenæum*, No. 1898.

1865.

April.—*The Coal Question.*

16th May.—"On the Variation of Prices and the Value of the Currency since 1782."—*Journal of the Statistical Society of London*, June 1865.

2d October.—Introductory Address on "Reading and Study" at the opening of session at Queen's College, Liverpool.

1866.

3d April.—"On a Logical Abacus."—Literary and Philosophical Society, Manchester.

1st June.—"Mr. Gladstone's Financial Policy."—*Macmillan's Magazine.*

1st July.—"On the Frequent Autumnal Pressure in the Money Market, and the Action of the Bank of England."—*Journal of Statistical Society.* "Brief Account of a General Mathematical Theory of Political Economy."—*Journal of Statistical Society.*

12th October.—Introductory Lecture at the opening of session of evening classes at Owens College, "On the Importance of Diffusing a Knowledge of Political Economy."

The Coal Question, 2d edition.

1867.

16th January.—Science Lectures for the People, No. IX., "On Coal—its Importance in Manufactures and Trade."

10th April.—"On the Analogy between the Post Office, Telegraphs, and other Systems of Conveyance of the United Kingdom as regards Government Control."—Manchester Statistical Society.

"Probable Duration of South Staffordshire Coal Field." *Geological Magazine.* Being the substance of a lecture delivered at the Midland Institute, Birmingham, on the 27th March.

1868.

[illegible]th March.—Lecture on the "Probable Exhaustion of our Coal Mines."—Royal Institution of Great Britain.

[illegible]st March.—Lecture on "Trades Societies; their Objects and Policy." Delivered by request of the Trades Unionists' Political Association in the Co-operative Hall, Hulme, Manchester.

[illegible]th April.—Evidence before the Royal Commission on International Coinage.

[illegible]th May.—"On the International Monetary Convention," etc. —Manchester Statistical Society.

[illegible]th November.—"On the Condition of the Metallic Currency of the United Kingdom," etc.—London Statistical Society.

1869.

February and March.—Lectures on Political Economy at Hyde. —Reported in the *North Cheshire Herald.*

13th March.—Report to the Chancellor of the Exchequer on the Pressure of Taxation.

8th May.—Letter "On the Value of Gold" in the *Economist.* Reprinted in the *Journal of the Statistical Society*, 1869.

June.—*The Substitution of Similars, The True Principle of Reasoning, Derived from a Modification of Aristotle's Dictum.*

Letters in the *Times* "On the Condition of the Metallic Currency of the United Kingdom," dated 27th August and 7th September.

October.—Inaugural Address to the Manchester Statistical Society, "On the Work of the Society in connection with the Questions of the Day."

1870.

January.—"On the Principle of the Conservation of Customs."—*Owens College Magazine.*

20th January.—Paper "On the Mechanical Performance of Logical Inference," read before the Royal Society.

25th January.—"On the so-called Molecular Movements of Microscopic Particles."—Manchester Literary and Philosophical Society.

"On a General System of Numerically Definite Reasoning."—Manchester Literary and Philosophical Society.

April.—"On Industrial Partnerships." Lecture delivered under the auspices of the National Association for the Promotion of Social Science.

30th June.—"On the Natural Laws of Muscular Exertion."—*Nature.*

18th August.—"On the Natural Laws of Muscular Exertion."—*Nature.*

15th September.—Opening Address as President of Section F of the British Association.

1st October.—*Elementary Lessons in Logic.*

8th December.—Memorial to the Home Secretary as to "Uniformity in Census of 1871."

1871.

9th February.—"The Power of Numerical Discrimination."—*Nature.*

"Report and Minutes of Evidence Royal Commission to Inquire into Several Matters Relating to Coal in the United Kingdom."

June.—"The Match Tax, a Problem in Finance."

October.—*The Theory of Political Economy.* [Translated into Italian.]

1872.

"On the Inverse or Inductive Logical Problem."—Literary and Philosophical Society, Manchester.

1873.

May.—"Who discovered the Quantification of the Predicate?"—*Contemporary Review.*

"The Use of Hypothesis," Extract from *Principles of Science.*—*Fortnightly Review.*

14th August.—"Lakes with two Outfalls."—*Nature.*

"The Philosophy of Inductive Inference," Extract from *Principles of Science.*—*Fortnightly Review.*

1874.

2d February.—*The Principles of Science, A Treatise on Logic and Scientific Method.*

14th May.—"Lakes with Two Outfalls."—Letter to *Nature.*

[illegible]th July.—"Mill's *Logic* and *The Principles of Science.*"—*Hull Correspondence.*

[illegible]pril.—"The Railways and the State." Essays and Addresses by Professors and Lecturers, Owens College.

[illegible]th November.—"The Progress of the Mathematical Theory of Political Economy."—Manchester Statistical Society.

"Théorie Mathématique de l'Echange. Question de priorité. Correspondance entre M. Jevons, Professeur à Manchester et M. Walras, Professeur à Lausanne."—*Journal des Economistes*, t. xxxiv.

1875.

August.—"The Solar Period and the Price of Corn," and "The progress of the Coal Question."—Papers read at the Meeting of the British Association, Section F.

16th September.—*Money and the Mechanism of Exchange.* [Translated into French, German, and Italian.]

7th October.—"Comte's Philosophy."—*Nature.*

December.—"The Post Office Telegraphs and their Financial Results."—*Fortnightly Review.*

1876.

8th March.—"On the United Kingdom Alliance, and its prospects of success."—Manchester Statistical Society.

14th April.—"The Future of the Skating Rink; a Serious speculation by a Philosophic Correspondent."—*Manchester Guardian.*

May.—"Cruelty to Animals, a Study in Sociology."—*Fortnightly Review.*

Article on "Boole."—*Encyclopædia Britannica*, vol. iv.

June.—*Primer of Logic.* [Translated into Italian and Hindustanee, and now being translated into Polish.]

November.—"The Future of Political Economy."—*Fortnightly Review.*

1877.

April.—"Cram."—*Mind.*

December.—"The Silver Question."—*Banker's Magazine.*

December.—"John Stuart Mill's Philosophy tested."—*Contemporary Review.*

Principles of Science, Second Edition.

1878.

April.—"On the Movement of Microscopic Particles suspended in Liquid."—*Quarterly Journal of Science.*

March.—*Primer of Political Economy.* [Translated into French and Italian.]

April.—"John Stuart Mill's Philosophy tested."—*Contemporary Review.*

August.—"Note on the Pedetic Action of Soap."—Section A, British Association.

August.—"The Periodicity of Commercial Crises and its Physical Explanation."—Read at the Meeting of the British Association, Section F.

October.—"Amusements of the People."—*Contemporary Review.*

24th November.—"Commercial Crises and Sunspots," Part I.—*Nature*.

19th November.—"Remarks on the Statistical Use of the Arithmometer."—Statistical Society.

1879.

January.—"A State Parcel Post."—*Contemporary Review*.

17th January.—"Commercial Crises and Sunspots."—Letter to *Times*.

13th February.—"Sunspots and the Plague."—Note in *Nature*.

19th April.—"Sunspots and the Plague."—Note in *Nature*.

24th April.—"Commercial Crises and Sunspots," Part II.—*Nature*.

The Theory of Political Economy, Second Edition, with new Preface.

November.—"John Stuart Mill's Philosophy tested."—*Contemporary Review*.

4th December.—"Sewage Pollution of the Thames."—Letter to the *Times*.

1880.

February.—"Experimental Legislation and the Drink Traffic."—*Contemporary Review*.

July.—"Postal Notes, Money Orders, and Bank Cheques."—*Contemporary Review*.

October.—*Studies in Deductive Logic*.

October.—Preface to the translation of Cossa's *Guide to Political Economy*.

1881.

January.—"Richard Cantillon and the Nationality of Political Economy."—*Contemporary Review*.

March.—"The Rationale of Free Public Libraries."—*Contemporary Review*.

May.—"Bimetallism."—*Contemporary Review*.

14th July.—"Symbolic Logic."—*Nature*.

1882.

January.—"Married Women in Factories."—*Contemporary Review*.

June.—*The State in Relation to Labour.*

July.—"List of Selected Books in Political Economy."—Monthly Notes of Library Association.

6th July.—"The Solar Commercial Cycle."—*Nature.*

August.—"Reflected Rainbows."—*Field Naturalist.*

1883.

Methods of Social Reform, and other papers. Collected from the *Contemporary Review* and elsewhere; edited by his wife.

1884.

Investigations in Currency and Finance. Edited by Prof. H. S. Foxwell.

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